

cycles



—A MONTHLY REPORT

December 1952

FOUNDATION FOR THE STUDY OF CYCLES

New York, New York

CONTENTS

	Page
THE DIRECTOR'S LETTER	335
HOW IT CAME OUT	
The 6-Year Cycle	337
The 6-Year Cycle in Allis-Chalmers	342
The 6-Year Cycle in Jones & Laughlin	344
The 6-Year Cycle in Sears, Roebuck	346
The 6-Year Cycle in Pittsburgh Plate Glass	348
The 6-Year Cycle in Youngstown Sheet and Tube	350
The 6-Year Cycle in Swift and Company	352
The 33-Month Cycle in Residential Building Construction	364
LETTERS	354
INDEX, VOL. III, JANUARY- DECEMBER 1952	355
ERRATA 1952	363

THE FOUNDATION FOR THE STUDY OF CYCLES

The Committee of the Foundation consists of the following scientists and administrators:

UNITED STATES OF AMERICA

Copley Amory, Chairman Emeritus	Harold Cardiner Powen Vice Admiral, U.S. Navy, Retired Executive Director, Thomas Alva Edison Foundation	Webster N. Jones Dean, College of Engineering and Science Carnegie Institute of Technology
Charles Greeley Abbot Research Associate Smithsonian Institution	Verne Burnett Partner Verne Burnett Associate	Daniel Trembly MacDougal Former Director Department of Botanical Research and Laboratory of Plant Physiology Carnegie Institution of Washington
Harold Elmer Anthony Chairman and Curator Department of Mammals American Museum of Natural History	Hon. W. Cameron Forbes Member, Board of Trustees Carnegie Institution of Washington; Life Member of the Corporation, Massachusetts Institute of Technology	John Quincy Stewart Professor of Astronomy, Physics Princeton University
George Backeland, Chairman of the Committee of the Foundation The Bakelite Corporation		

CANADA

Hon. Charles Camsell Former Commissioner Northwest Territories	Frank Cyril James Principal and Vice-Chancellor McGill University
--	---

GREAT BRITAIN

Sir Patrick Ashley Cooper Governor Hudson's Bay Company	Julian Sorell Huxley Former Director General United Nations Educational, Scien- tific and Cultural Organizations
---	---

Edward R. Dewey, Director

CYCLES — A Monthly Report is published by the Foundation for the Study of Cycles every month except during July and August at the Foundation's offices at 9 East 77th Street, New York 21, N. Y. Subscription rates \$10.00 a year. Entered as second class matter at the Post Office at New York, N. Y. Letters for the personal attention of the Director should be sent to East Brady, Pennsylvania.

cycles

— a monthly report

*The Official Bulletin of
the Foundation for the
Study of Cycles*

VOLUME III NUMBER 10 DECEMBER 1952

The Director's Letter

Dear Member:

Lately, I have been keeping my nose pretty close to the grindstone. That is to say I have been trying to discover and record a body of fact in regard to cycles so that some Einstein can come up with a workable theory in regard to cycles. Some one has to do the ground work. I seem to be elected for this task.

But it might be fun to let fancy run free and to tell you my own private notions in regard to cycles, warning you that what I am about to say is pure conjecture without a shred of scientific evidence to support it.

To start at the beginning, you probably know that x-rays, visible light, and radio waves are all considered to be different manifestations of the same sort of thing. These waves, as well as infrared light, ultraviolet light, gamma rays, and secondary cosmic rays are all grouped together under the general classification of "electromagnetic radiation." A spectrum giving the wave length and frequency of all these different waves as compiled by Compton and Caldwell was published by **Radio Today**. It is reproduced below.

If we have electromagnetic waves that come a billionth of a second apart, a millionth of a second apart, and a thousandth of a second apart, why not electromagnetic

waves that come even less frequently, let us say a thousand seconds apart, a million seconds apart, a billion seconds apart. A thousand seconds would be about 16 minutes, a million seconds would be about 11½ days, a billion seconds would be about 31½ years. Why not?

If there were electromagnetic waves of these lengths and longer, and various intervening lengths, how else would we know of their existence except as they influence the phenomena upon which they impinge? Certainly no electrical devices in the laboratories are going to tune in to waves that are several years from crest to crest, but such waves might affect plants and/or animals either directly or indirectly. The indirect effect might be brought about through weather or through an effect upon the sun which, in turn, might influence weather and/or plants and/or animals by means of variations of ultraviolet light or otherwise.

The fact that we find cycles of seemingly identical wave length upon the sun and upon earth gives support to the idea that in studying cycles we are studying something very fundamental indeed. Also the fact that some order is beginning to come out of the chaos of cycles gives hope that we may be on the edge of unraveling some

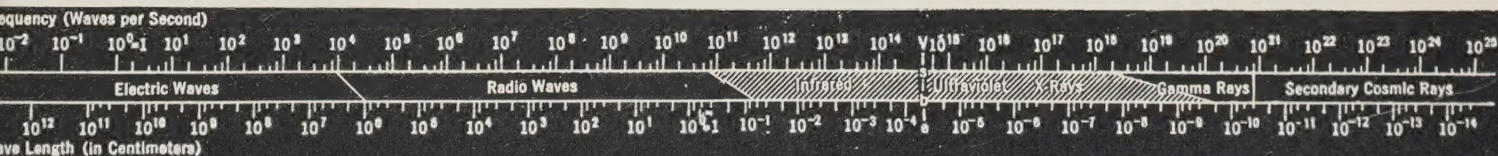


FIG. 11. WAVE SPECTRUM (AFTER COMPTON AND CALDWELL)

Spectrum of Electromagnetic Waves with Lengths from 10^{12} to 10^{-14} Centimeters; that is, with Frequencies from 10^{-2} to 10^{25} Waves per Second

of nature's great secrets. Who knows.

The hypothesis outlined above was first developed in 1940 when I discovered what seemed to be identity of wave length between cycles in sunspots with alternate cycles reversed and cycles on earth. Nothing that I have learned in the 12 years that have elapsed has upset my original hypothesis. In fact, everything I have learned has fitted into it.

The hypothesis has one advantage that is worth recording. It does not tie you down to any particular wave lengths that "ought" to be present. As far as my theory is concerned we could have cycles of any and every possible wave length. The task of the moment is merely to find out what these wave lengths are. We do not need to be inhibited by preconceived notions of what they should be. Eventually, when we get enough material assembled, we may be able to advance a law of cycle length that will say that cycles caused by these electromagnetic forces (if that is what causes them) come in some particular wave lengths and not in others. Information of this sort might or might not be of great value to the physicist, I do not know, but it would certainly be invaluable to the students of economic and biological cycles.

* * *

And now back to the grindstone:

I am going to devote almost all of this report, except for the Index for 1952, to showing you how the 6-year cycle has been working out in recent years. If you are one of our older members you will recall that in 1949 I made an extensive study of the 6-year cycle. I found it not only in the sales and production figures of individual corporations but also in cotton prices over a period of 200 years, in tree rings for over 1000 years, in cotton production, in

rayon production, in barometric pressure at New York, and in sunspots with alternate cycles reversed for as far back as figures are available.

It seemed to me then and it still seems to me that in the 6-year cycle we have the best evidence yet uncovered to show that the cycles we observe in human affairs have their counterpart in weather, in plant life, and in behavior outside the earth.

The 6-year cycle is also present in the stock market but so faintly that it cannot be seen until you subject the figures to a good deal of manipulation. Consequently, the 6-year cycle is of no practical use in forecasting the behavior of the stock market as a whole, except as you take it into account in combination with other cycles. However, it is possible that it would be of value in attempting to forecast the behavior of individual stocks.

As far as I know, the 6-year cycle was first discovered by Chapin Hoskins in the sales of a large glass company for which he was consultant and in the price of lard over a period of many years. Subsequently, I discovered it in the natural phenomena named above and in the orders received by the General Electric Company.

I then invited a hundred of the largest industrial concerns in the country to cooperate in a study of the 6-year cycle in their own sales and/or production figures. About 50 companies accepted the invitation, but many of the series of figures supplied were too short to use. Of the usable figures, 25 showed the 6-year cycle and three, or perhaps four, did not.

In this report I have room to report upon how the forecast has worked out for only seven or eight companies. In an early issue I will report upon the way it has worked out for the remaining companies.

Cordially yours,

Edward R. Dewey
Director

How it Came Out

THE 6-YEAR CYCLE

IN 1949 we made a study of the six-year cycle as it appeared in various natural and social phenomena. This material was published in our December 1950 report on a 15-page article called "The Six-Year Cycle."

Phenomena Studied

The phenomena studied included the following:

Barometric pressure at New York City
Tree rings at Fairlee, Vermont
Sunspots with alternate cycles reversed
Cotton prices
Rayon production
Cotton production
Industrial common stock prices
And the sales, shipments, orders received, operating income, or production of some 25 large American corporations.

Typical Timing

Typical timing of the crests of the six-year cycle would seem to be 1942, 1948, 1954, etc., but some of the series of figures seemed to be "early turners," with crests coming ideally in 1941, 1947, 1953, etc.; some were "late turners," with crests coming ideally in 1943, 1949, 1955, etc.

Early Turners

Those companies that seemed to be "early turners" with the crests due ideally in 1947, 1953, etc. include:

American Viscose Corporation, shipments in pounds.
Bethlehem Steel Company, production in net tons.
E.I. du Pont de Nemours & Company, dollar sales to customers.
Inland Steel Company, net dollar sales.

Jones & Laughlin Steel Corporation, total dollar sales.

Monsanto Chemical Company, dollar sales.

Montgomery Ward & Co., net dollar sales.

Pittsburgh Plate Glass Company, net dollar sales.

Typical Turners

Those companies of typical timing with crests ideally due in 1942, 1948, 1954, etc., include:

Allis-Chalmers Manufacturing Company, dollar sales billed.

Armour and Company, dollar sales.

General Electric Company, orders received, in dollars.

Republic Steel Corporation, ingot production, net tons.

Sears, Roebuck and Co., net sales.

Youngstown Sheet and Tube Company, gross dollar sales.

Wilson & Co., dollar sales.

Late Turners

Those companies which seem to be "late turners" with crests ideally due in 1943, 1949, 1955, etc., include:

Armco Steel Corporation, dollar sales.

Continental Oil Co., gross operating income.

B.F. Goodrich Company, net dollar sales.

Goodyear Tire & Rubber Company, net dollar sales.

National Lead Company, net sales.

Proctor & Gamble Company, gross dollar sales.

Seaboard Air Line, gross operating revenue.

Standard Oil Company of California, gross operating income.

Swift & Company, dollar sales.

United States Rubber Company, net dollar sales.

For each series of figures we projected

what seemed to be its characteristic 6-year pattern. How have these projections worked out?

We have already shown you in our October 1952 report how the projection worked out for Armour & Company and the Pittsburgh Plate Glass Company. On the following pages I am bringing up to date a number of the other series. As soon as possible we will bring them all up to date. Then we can start in to do the job all over again, using figures for 1952 to give you an additional year of experience.

Actual Values Now Charted

In the report for December 1950 lack of space prevented me from showing you a chart of the actual figures. I had to be content with showing you merely the deviations from trend. In this article, however, I am taking the space to show charts of

the raw unmanipulated data, as well as the deviations from trend.

For each series of figures, therefore, there will be two charts. The upper chart will show the actual data together with its trend. The lower chart will show deviations from the trend; that is, it will show the percentages by which the actual figures are above or below the trend line. In other words it will show the values adjusted for trend.

Mechanics

And now a word or two about mechanics of presentation.

The previous work was done in 1949, at which time the latest available figures were for 1948. The upper charts show values from the earliest year for which figures are available through 1948, plotted by means of a light solid line. Values for

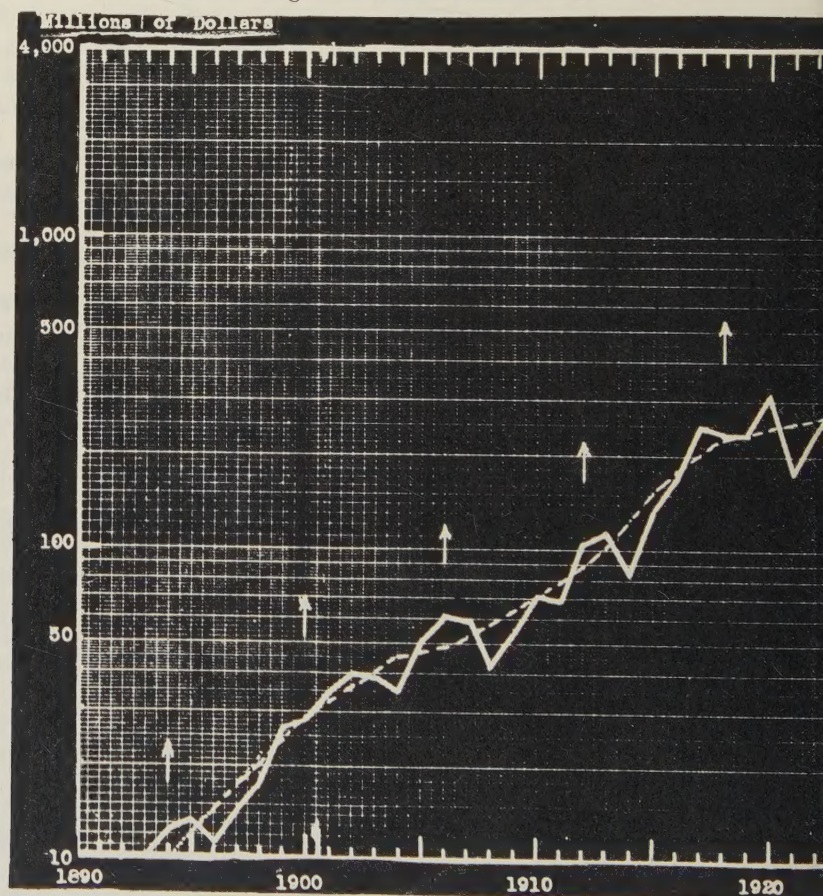


FIG. 1. ORDERS RECEIVED BY TH

A SIX-YEAR MOVING AVERAGE TREND HAS BEEN ADDED BY MEANS OF A BROKEN LINE. BECAUSE A SIX-YEAR MOVING AVERAGE LOSES THREE YEARS

AT EACH END OF THE SERIES, THE THREE TREND VALUES AT EACH END OF THE SERIES ARE ESTIMATED. ARROWS SHOW TIME OF CREST OF IDEAL

1949, 1950, and 1951, which have become available since the work was done, are plotted by means of a heavy solid line.

The trend used was a 6-year moving average. These values are shown by means of a broken line. Such a trend cannot be correctly determined within three years of the end of the series of figures. For this reason in the original work trend values stopped in 1945 and of course the deviations from trend had to stop there too. Now however, with data through 1951, trend can be computed through 1948, and the "how-it-came-out" values can be plotted through 1948 also. These too are shown by a heavy line.

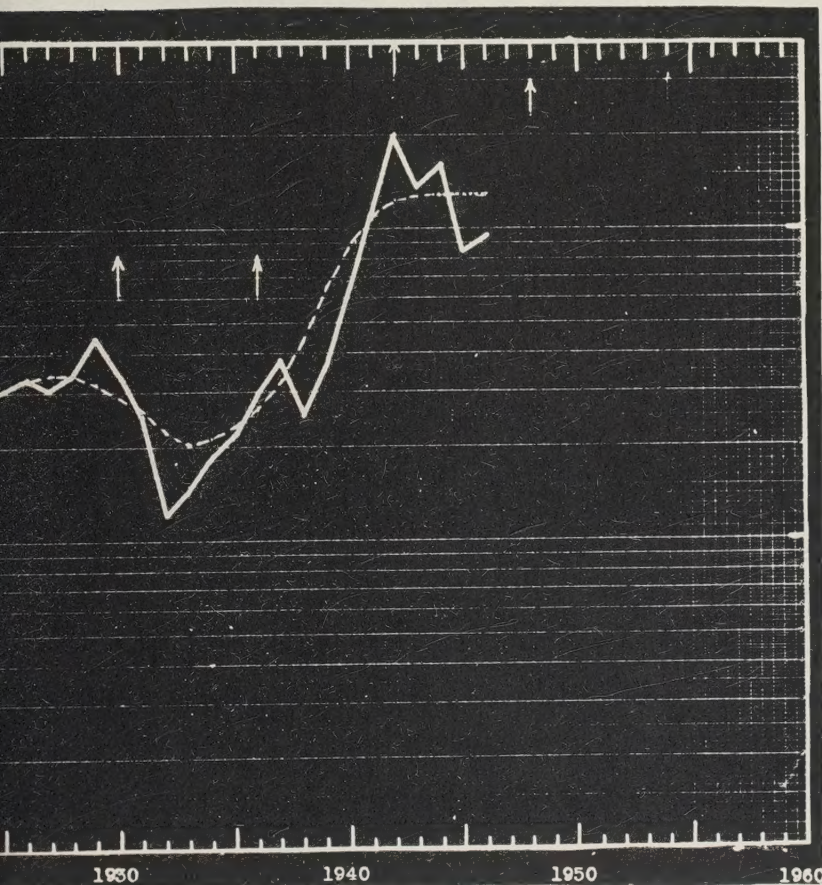
Up to the Minute Values Wanted

It is always exasperating to look at a chart three years behind the times when one wants up-to-the-minute information. In

the following charts, therefore, wherever possible I am estimating trend for 1949, 1950, and 1951. These estimates are shown on the chart by means of a dotted line. The percentages that the actual values are of this estimated trend are shown by means of a heavy broken line. These latter values can be revised as time unfolds.

I have also taken the liberty of estimating the first three values of the trend line and computing the percentages that the actual values are of these estimates. This procedure gives us another half cycle at the beginning of the figures.

The ideal 6-year cycle is diagrammed on the deviations by means of a zigzag line. Most of these zigzags are symmetrical, but in some cases they go down faster than they go up, or up faster than they go down. The timing of the crests and troughs is the timing determined in 1949. With addi-



GENERAL ELECTRIC COMPANY, 1893-1946

SIX-YEAR CYCLES. THE CURVE STOPS IN 1946 BECAUSE THE COMPANY HAS NOT MADE THESE FIGURES PUBLIC SINCE THAT TIME.

NOTE THE WAY IN WHICH THE SIX-YEAR CYCLE HAS DOMINATED THESE FIGURES FROM THE BEGINNING. RATIO SCALE.

tional figures, in some instances, the timing might change slightly.

I have added arrows to the charts of actual data to show ideal timing of crests. I always find these arrows very helpful.

As I said in my article in the December 1950 report, you must remember in respect to each of these curves that there have been distortions in the past and that there will most certainly be distortions in the years to come, even though the rhythms continue in full force and effect in the future as in the past.

Significance

And now a word about significance:

The longer series provide their own internal evidence of significance. In the General Electric series for example it is unlikely that there could be nine successive repetitions of a 6-year wave of the demonstrated regularity merely as a result of random forces.

So that you can see what I mean, I am repeating below the charts for the General Electric Company orders received 1893--1946 even though there is no way to bring

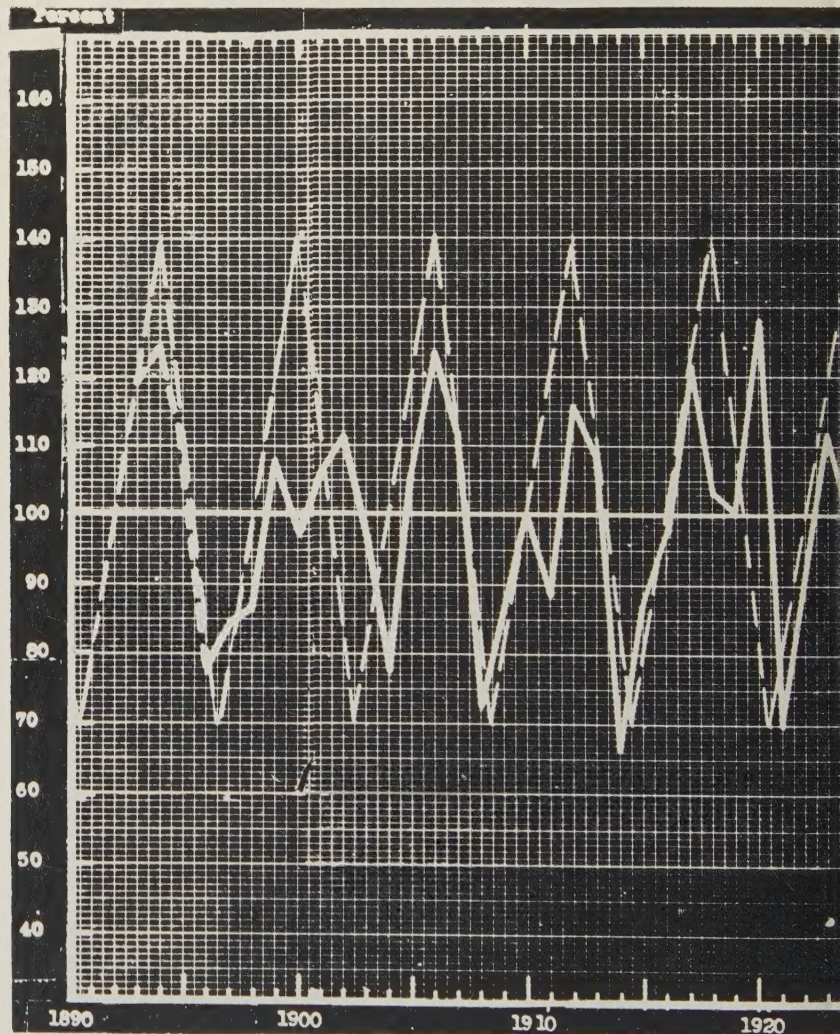


FIG. 2. THE 6-YEAR CYCLE IN GENERAL

THIS CURVE IS OBTAINED FROM THE TWO CURVES IN FIG. 1.

IT SHOWS THE PERCENTAGES THAT THE ACTUAL DATA, PLOTTED BY THE SOLID LINE IN FIG. 1,

ARE OF THE CORRESPONDING POINTS OF THE SIX-YEAR MOVING AVERAGE, PLOTTED IN FIG. BY A BROKEN LINE. IN OTHER WORDS, THE CURVE REPRESENTS THE ACTUAL VALUES CORRECTED FOR

these curves up to date. The company has ceased to make these figures public.

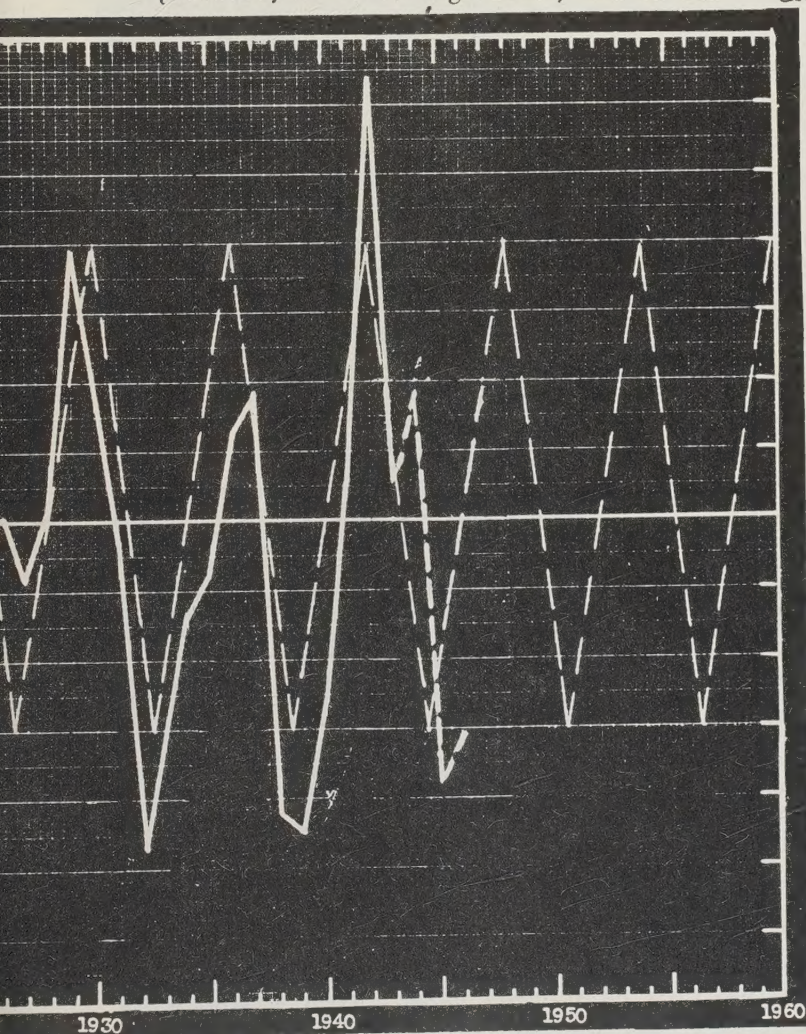
The shorter series give you no such internal evidence, but they are part of the same economy and presumably are actuated by the same basic forces that govern the older companies.

6-Year Cycle in Natural Phenomena

However it is when you leave the field of economics entirely and find what seems to be the same behavior in barometric pressure, in tree ring widths, and in sun-

spots, that you begin to realize that in this behavior we are probably dealing with something very fundamental.

In tree rings you will remember (Foundation Report No.7) that we have a 6-year cycle present on the average in each of six 180-year sections back to 800 A.D. The exact length of the average cycle in the tree rings is 6.03 years. If future work shows the tree ring cycle to be truly rhythmic, we will have had 180 repetitions in the data so far studied. This should be enough to satisfy even Saint Thomas. erd



ELECTRIC COMPANY ORDERS RECEIVED. 1893-1946

TREND. IT SHOWS WHAT WE WOULD HAVE IF WE "PULLED" THE BROKEN LINE IN FIG. 1 INTO A STRAIGHT HORIZONTAL POSITION, PLOTTED IT AT 100, AND BROUGHT THE SOLID LINE ALONG WITH

IT, AS IT WERE. A PERFECTLY REGULAR SIX-YEAR CYCLE HAS BEEN ADDED BY MEANS OF A BROKEN LINE, TO AID THE EYE.

THE 6-YEAR CYCLE IN ALLIS-CHALMERS

ALLIS-CHALMERS Manufacturing Company dollar sales billed are available from 1913. These figures are plotted by means of a solid line in Fig. 1 opposite. Because the values from 1948 forward have become available since the 6-year cycle in these figures was discovered, they are shown by means of a heavy solid line.

The broken line in Fig. 1 shows the trend. It is a 6-year moving average of the actual sales. The first three values of this trend and the last three values are estimates.

The little arrows in Fig. 1 indicate the time of the typical or ideal 6-year cycle in this series of figures. The actual crests, of course, come sometimes early and sometimes late. The 6-year cycle is merely a **tendency**.

Fig. 2 shows the sales of Allis-Chalmers adjusted for trend. This adjustment makes it possible to see the 6-year cycle more clearly.

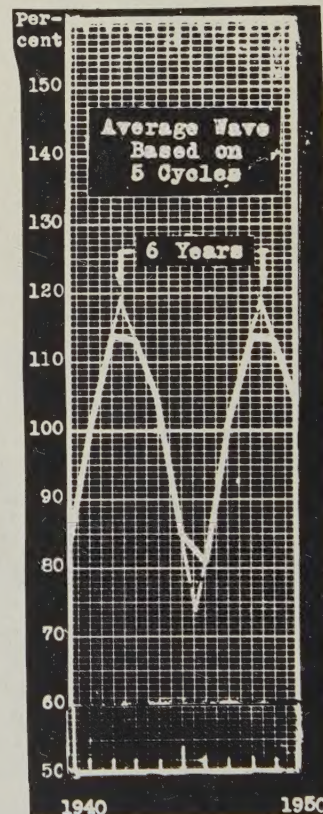
When Fig. 2 was first published, it stopped in 1945 because the moving average trend could not be computed beyond that year. Now that three years have elapsed, three more points can be added to this chart. These points have been connected with a solid line, which is also heavy to indicate how the forecast made three years ago has worked out.

As stated above, the trend values for 1949, 1950, and 1951 are pure estimates. They are almost certainly wrong and the deviations from them, plotted in Fig. 2 as a broken line, are almost certainly wrong.

The 6-year cycle in Allis-Chalmers sales has been clearly evident from 1913, when the figures began, up to date. We thus have six complete cycles to go on. The typical or average wave, based on five cycles, is shown below. Crests in this series of figures come ideally between 1948 and 1949 and every six years forward and backward from that date. Troughs come three years after crests.

The trough projected for half way be-

tween 1945 and 1946 came in 1946, half a year late. The crest projected for half way between 1948 and 1949 came in 1948, half a year ahead of perfect timing. We can tell better about the low when figures for 1952 have become available. On the whole, however, the next few years should be good for Allis-Chalmers sales, with a crest of sales relative to trend due ideally between 1953 and 1954.



Six repetitions of a cycle could come about by accident. However, the fact that a cycle of this length persists in other series of figures over a long period of time and the further fact that this cycle in these figures has continued to come true after discovery makes me believe that this cycle in these figures should be taken into account as a definite possibility for the future.

erd

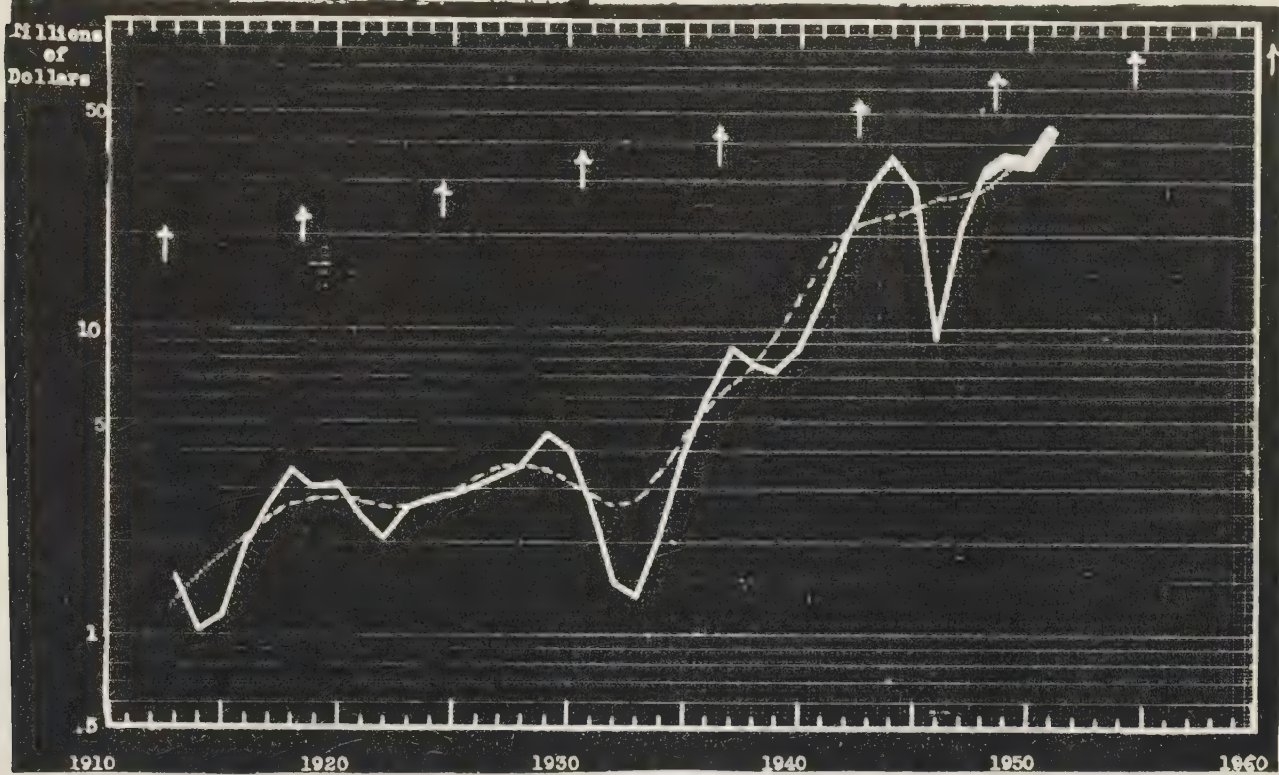


FIG. 1. ALLIS-CHALMERS, TOTAL DOLLAR SALES, 1913-1951, TOGETHER WITH A SIX-YEAR MOVING AVERAGE TREND. (FIRST THREE AND LAST THREE VALUES ESTIMATED). ARROWS INDICATE TIME OF IDEAL HIGH OF SIX-YEAR CYCLE. RATIO SCALE.

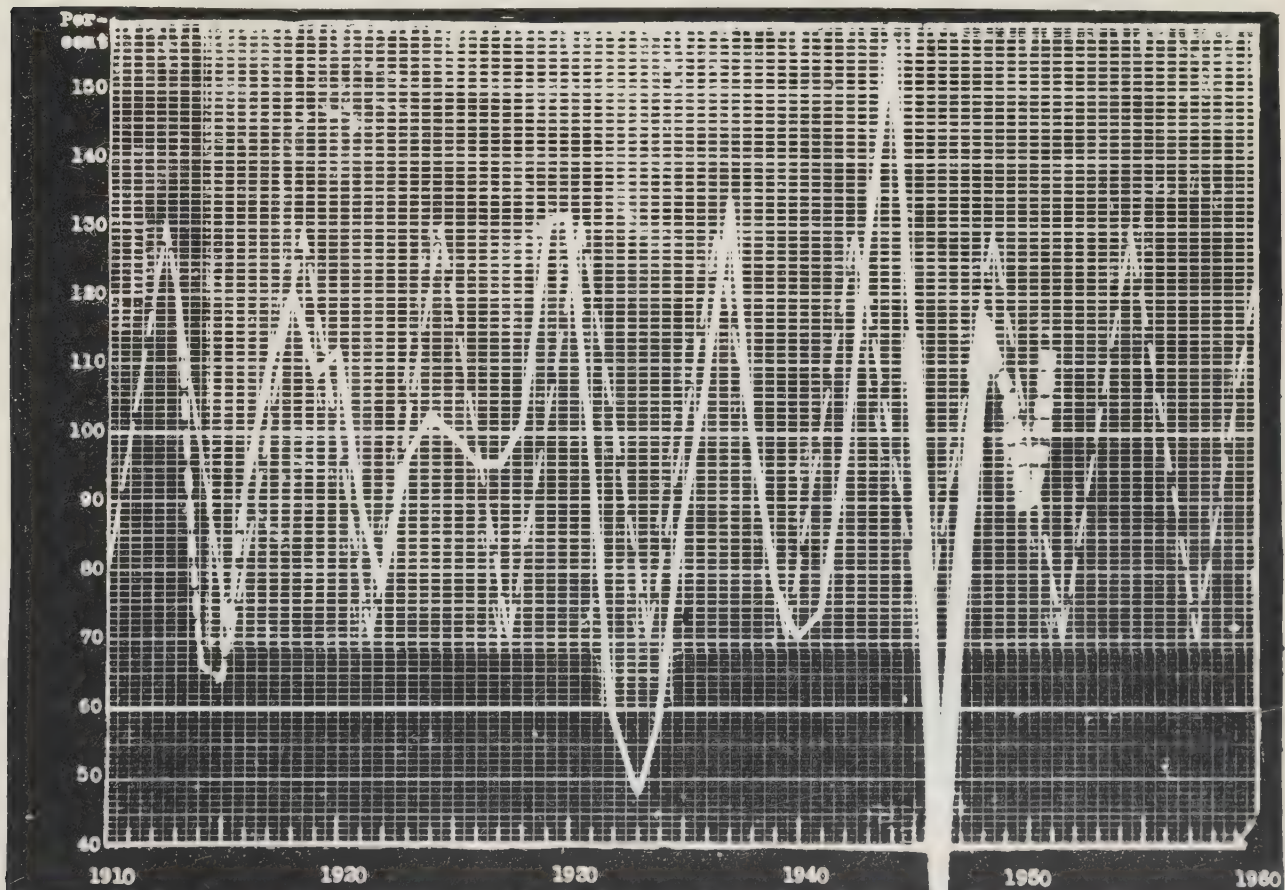


FIG. 2. THE SIX-YEAR CYCLE IN ALLIS-CHALMERS, TOTAL DOLLAR SALES, DEVIATIONS OF THE ACTUAL SALES FROM THEIR SIX-YEAR MOVING AVERAGE. BOLD LINE SHOWS HOW THE FORECAST HAS WORKED OUT.

THE 6-YEAR CYCLE IN JONES & LAUGHLIN

TOTAL dollar sales of the Jones and Laughlin Steel Corporation are available from 1923. They are plotted by means of a solid line in Fig. 1 opposite. Values from 1948 forward are plotted by means of a heavy line so that you can see how they have behaved since the 6-year cycle in these figures was first observed.

The broken line in Fig. 1 shows the trend. It is a 6-year moving average of the actual sales. The first three values of this trend and the last three values are estimates.

The little arrows in Fig. 1 indicate the time of the typical or ideal 6-year cycle in this series of figures. The actual crests, of course, come sometimes early and sometimes late.

Fig. 2 shows the sales of Jones and Laughlin adjusted for trend. This adjustment makes it possible to see the 6-year cycle more clearly.

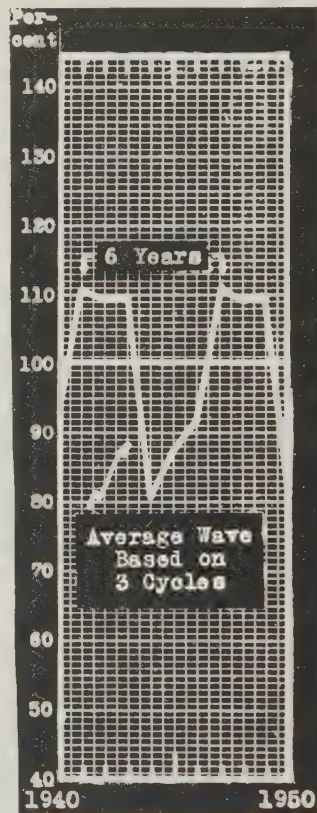
Because a moving average trend loses three values at each end, the deviations from such a trend also have to stop three years before the last available figure. When this work was originally done figures were available only through 1948. At that time, therefore, the moving average stopped and the deviations from the moving average, shown in Fig. 2, also stopped, in 1945. Now that three years have passed, three more points can be added to this chart and it can be extended to 1948. This has been done by means of a heavy line so that you can see how the 6-year cycle in these figures has come out.

Also, as I have now estimated the trend of this company we can tentatively add three additional figures by means of a broken line so as to bring the chart up to date, in a preliminary sort of way.

As you can see by studying the charts on the opposite page, the 6-year cycle has been clearly evident in these figures from the beginning, even though it has been much more distorted than in many of the other series.

If you average the behavior of the 6-

year cycle for the three full cycles that were available in 1948 when this work was first done you get an average wave which is charted below:



This average cycle has a peculiar shape, partly because there are so few waves to average and also because there may be a two-year cycle in these figures along with the 6-year cycle.

As the actual average crest came in 1947, I originally diagrammed this cycle as cresting in this series of figures in 1947, going down for three years, and going up for three years. I have repeated this pattern in Fig. 2 exactly as originally printed.

However, if I were to do it over I would diagram the crest a year later, in 1948, and show the curve going down for two years and going up for four years.

erd

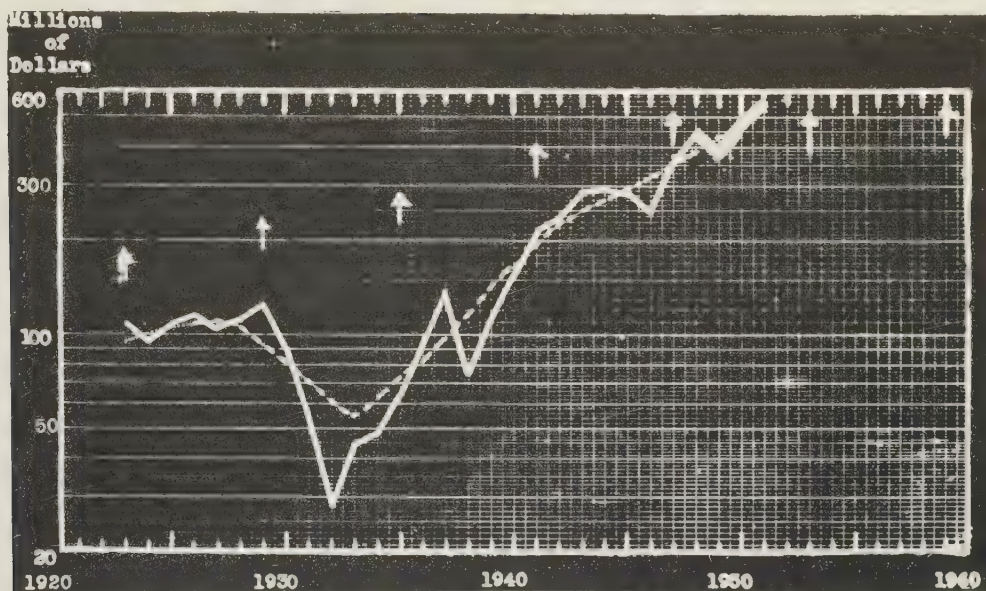


FIG. 1. JONES AND LAUGHLIN STEEL CORPORATION, TOTAL DOLLAR SALES, 1923-1951, TOGETHER WITH A SIX-YEAR MOVING AVERAGE TREND. (FIRST THREE AND LAST THREE VALUES ESTIMATED). ARROWS INDICATE TIME OF IDEAL HIGH OF SIX YEAR CYCLE. RATIO SCALE

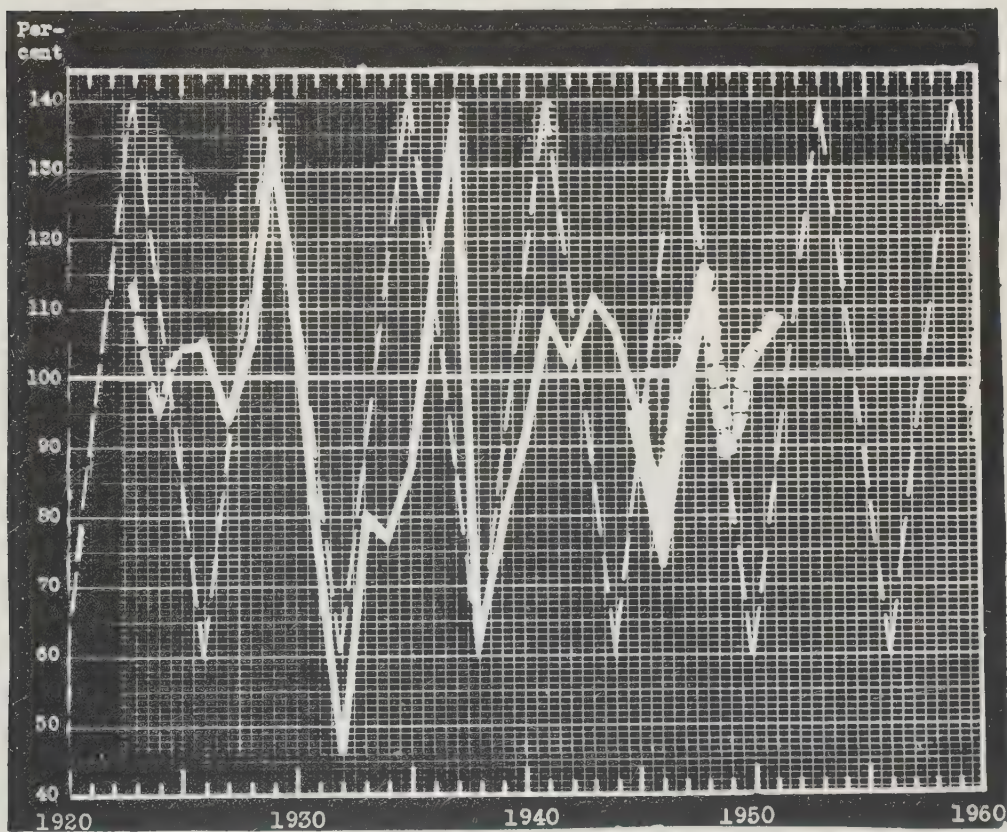


FIG. 2. THE SIX-YEAR CYCLE IN JONES AND LAUGHLIN, TOTAL DOLLAR SALES, DEVIATIONS OF THE ACTUAL SALES FROM THEIR SIX-YEAR MOVING AVERAGE. BOLD LINE SHOWS HOW THE FORECAST HAS WORKED OUT.

THE 6-YEAR CYCLE IN SEARS, ROEBUCK

SEARS, ROEBUCK & CO. were able to provide net sales from 1907 to date. These figures are plotted by means of a solid line in Fig. 1 opposite. Values from 1948 forward are shown by means of a heavy line because they have become available since the 6-year cycle in these figures was first observed.

The broken line in Fig. 1 shows the trend. It is a 6-year moving average of the actual sales. Because a moving average loses three values at each end of the series, the first three values of this trend and the last three values are estimates.

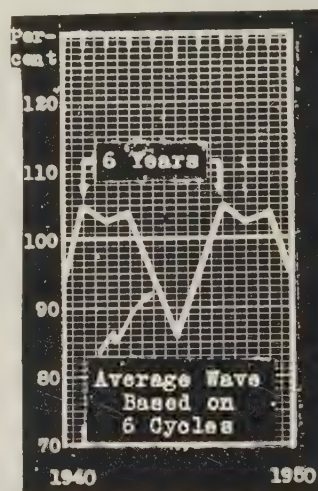
The little arrows in Fig. 1 indicate the time of the typical or ideal 6-year cycle in this series of figures (crests).

Fig. 2 shows the sales of Sears, Roebuck & Co. adjusted for trend. This adjustment makes it possible to see the 6-year cycle more clearly. Because a moving average loses three years at each end of the series, Fig. 2 originally stopped in 1945. The heavy line from 1945 through 1948 shows how the cycle has unfolded now that figures for three more years are available.

Because it is exasperating to look at charts that are not up-to-date, I have ventured to estimate trend for Sears, Roebuck & Co. for 1949, 1950, and 1951, and to compute the deviations of the actual figures from these estimates of trend. These estimates are almost certainly wrong and will have to be corrected when the actual figures become available, but they do serve a useful purpose notwithstanding. For example, they show clearly that the crest of the last 6-year cycle came in 1948 exactly on time.

The average cycle, based on the six cycles available when the study was made, crests in 1948 and six years forward and backward from that date. It is symmetrical, going down for three years and up for three

years. The flat top may be due to the concurrent presence of a 2-year or 3-year cycle. This possibility has not been investigated. The average cycle is shown below:



The 6-year cycle in Sears, Roebuck & Co. has repeated with remarkable regularity over the entire available history of the company. Without figures for 1905 and 1906 we can not see whether or not the first crest came on time, but of the remaining seven crests, two came on time; the remaining five came within one year one way or the other of perfect timing. It is too soon to know if 1951 was the low of the present cycle, but of the seven remaining lows four came exactly on time and three came within one year one way or the other of perfect timing.

We are justified in assuming that the 6-year cycle in these figures is something to be watched and taken into account as a possibility for the future. The 6-year cycle augurs well for the relative sales of Sears, Roebuck & Co. for the next three years, assuming of course, that it continues.

erd

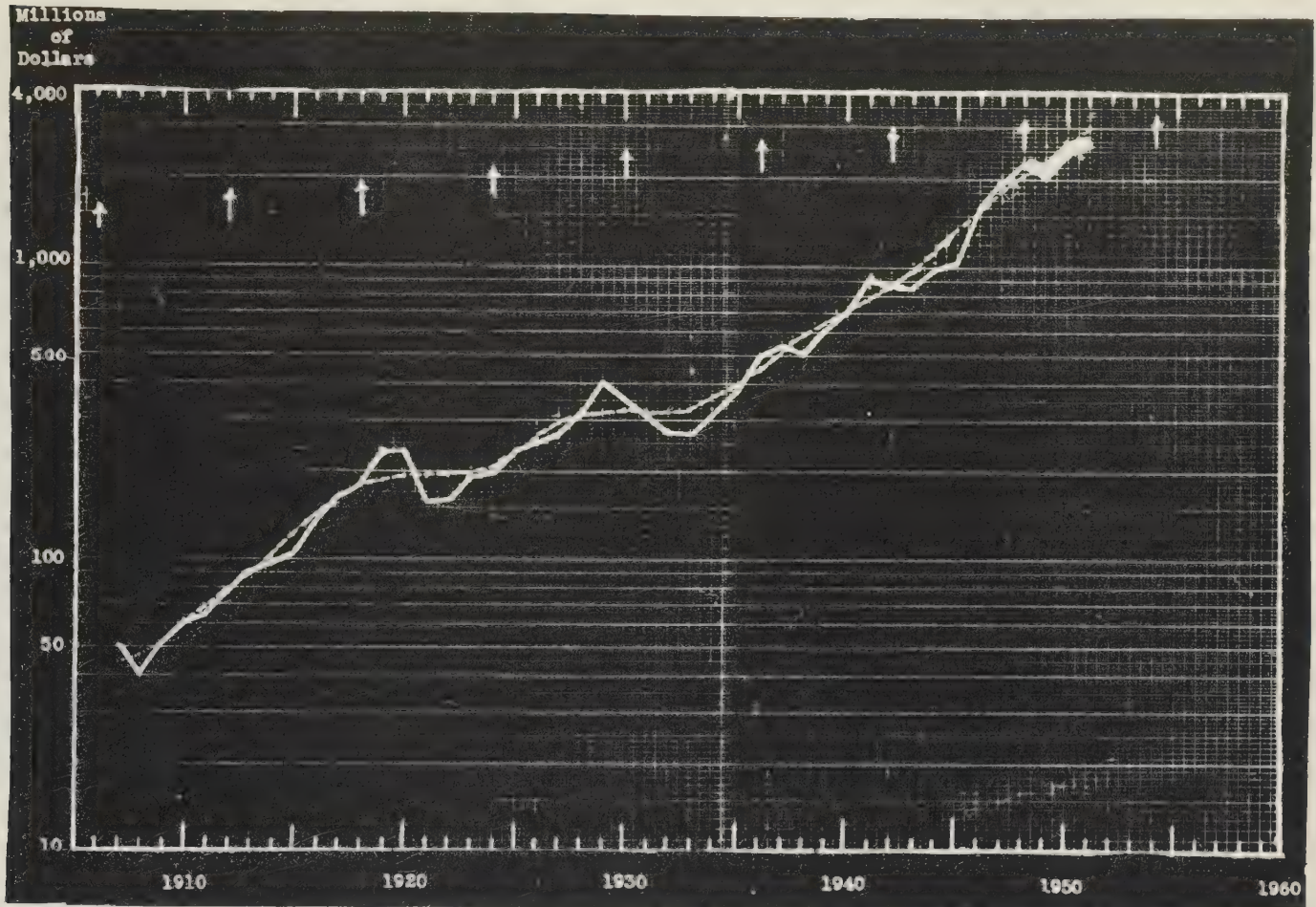


FIG. 1. SEARS, ROEBUCK AND COMPANY, TOTAL DOLLAR SALES, 1905-1951, TOGETHER WITH A SIX-YEAR MOVING AVERAGE TREND (FIRST THREE AND LAST THREE VALUES ESTIMATED). ARROWS INDICATE TIME OF IDEAL HIGH OF A SIX-YEAR CYCLE. RATIO SCALE.

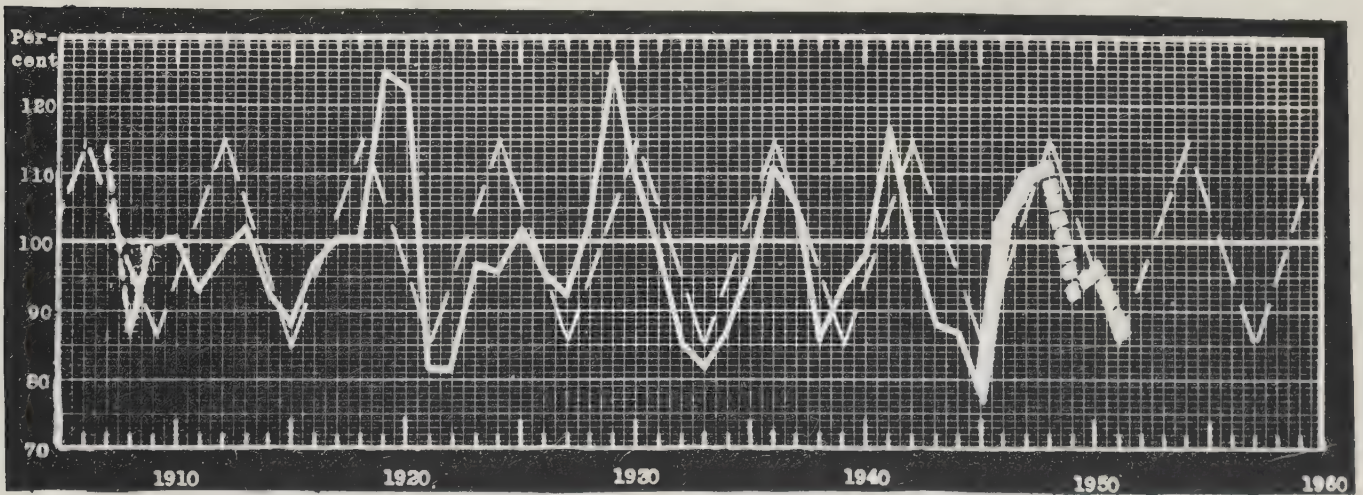


FIG. 2. THE SIX-YEAR CYCLE IN SEARS, ROEBUCK AND COMPANY, TOTAL DOLLAR SALES, DEVIATIONS OF THE ACTUAL SALES FROM THEIR SIX-YEAR MOVING AVERAGE. BOLD LINE SHOWS HOW THE FORECAST HAS WORKED OUT.

THE 6-YEAR CYCLE IN

PITTSBURGH PLATE GLASS

NET dollar sales of the Pittsburgh Plate Glass Company are available from 1905. They are plotted by means of a solid line in Fig. 1 on the opposite page. Because the values from 1948 forward have become available since the 6-year cycle in these figures was discovered, they are shown by means of a heavy line.

The broken line in Fig. 1 shows the trend. It is a 6-year moving average of the actual sales. The first three values of this trend and the last three values are pure estimates. The little arrows in Fig. 1 indicate the time of the typical or ideal 6-year cycle in these figures. The actual crests, of course, come sometimes early and sometimes late.

Fig. 2 shows the sales of Pittsburgh Plate Glass adjusted for trend so that you can see the 6-year cycle more clearly.

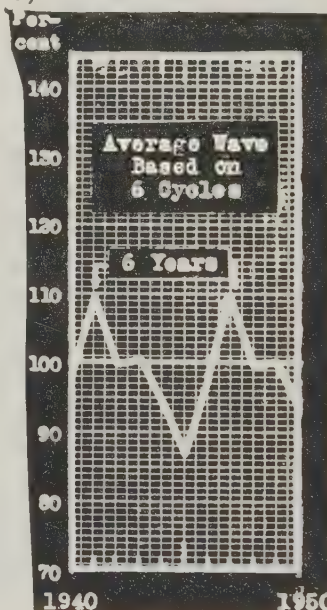
When Fig. 2 was first published, it stopped in 1945 because the moving average trend could not be computed beyond that year and so, of course, the deviations from trend could not be computed either. Now that three more years have passed, three more points can be added to this chart. These points have been connected with a solid line which has been drawn wide to indicate how the forecast made three years ago has worked out. This brings the curve up to 1948.

Up to 1948 we are on solid ground but I have ventured to forecast the trend of Pittsburgh Plate Glass Company for three additional years and to show, in Fig. 2, the deviations from these estimates by means of a broken line. These estimates are almost certainly wrong, but they do serve a useful purpose in indicating the general configuration of the curve in 1949, 1950, and 1951. They make it abundantly clear, for example, that the crest of the last 6-year cycle in these sales came in 1947, exactly on schedule time. They suggest that the current low came in 1949 about two years early, but it is a little too soon to be sure.

The available figures show something

over seven complete cycles. Most of them have been pretty good except the one due in 1917 where the crest came in 1920, three years after it was due.

The shape of the average wave, based on six cycles, is shown below:



Ideal time of crest is 1947 and six years forward and backward from that date. Average time of trough is 1945 and six years forward and backward. The typical wave thus goes down for four years and up for two. The little offset in the typical wave is probably due to accidental variation and probably has no significance.

I think it fair to say that the sales of the Pittsburgh Plate Glass Company since the beginning have been dominated by a 6-year cycle. The fact that this cycle has continued to come true after discovery tends to strengthen the belief in its reality. I feel that we should continue to utilize a knowledge of this cycle to throw light on the probable future behavior of the sales of this company. The next crest, relative to trend, is due ideally in 1953, this company being an "early turner."

erd

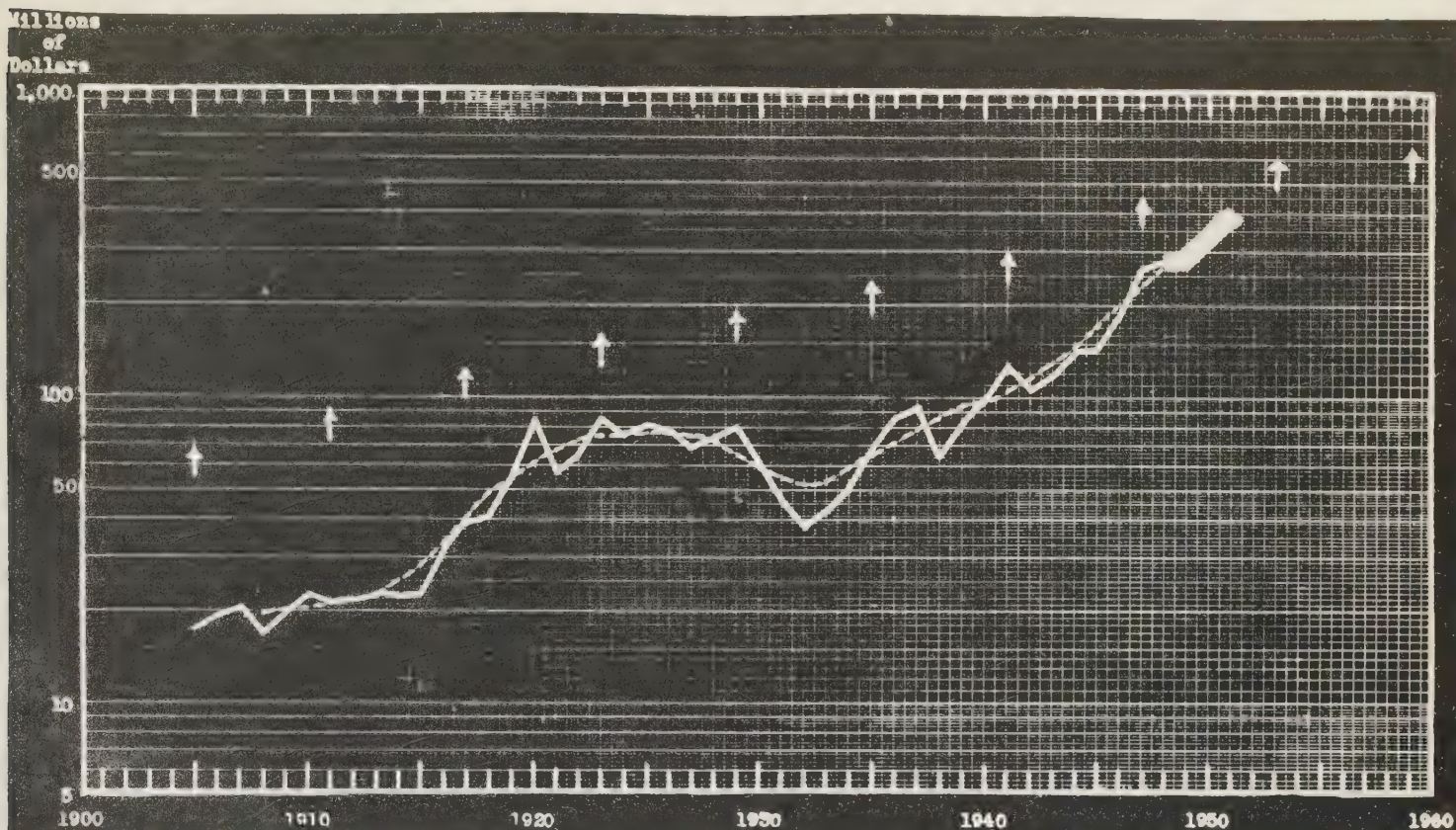


FIG. 1. PITTSBURGH PLATE GLASS COMPANY, TOTAL DOLLAR SALES, 1905-1951, TOGETHER WITH A SIX-YEAR MOVING AVERAGE TREND (FIRST THREE AND LAST THREE VALUES ESTIMATED). ARROWS INDICATE TIME OF IDEAL HIGH OF SIX-YEAR CYCLE. RATIO SCALE.

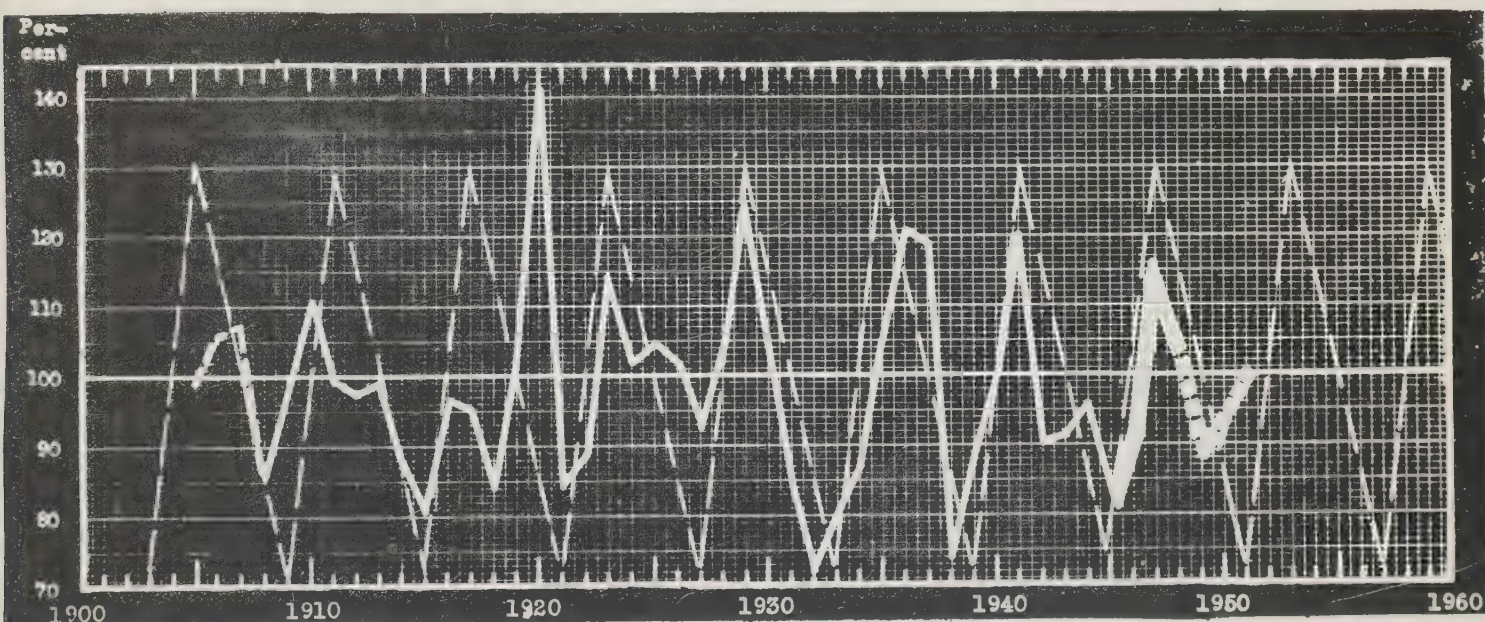


FIG. 2. THE SIX-YEAR CYCLE IN PITTSBURGH PLATE GLASS COMPANY, TOTAL DOLLAR SALES, DEVIATIONS OF THE ACTUAL SALES FROM THEIR SIX-YEAR MOVING AVERAGE. BOLD LINE SHOWS HOW THE FORECAST HAS WORKED OUT.

THE 6-YEAR CYCLE IN YOUNGSTOWN SHEET AND TUBE

ROSS dollar sales of the Youngstown Sheet and Tube Company are available from 1923 forward. These values are plotted by means of a solid line in Fig. 1, opposite. The values from 1948 forward are plotted by means of a heavy line so that you can see how the sales have behaved since this cycle in these figures was first discovered.

Trend is shown in Fig. 1 by means of a broken line. The trend used was a 6-year moving average. Such a trend cannot be computed accurately for the first three and the last three values of the series. The three values of the trend at each end of the series are therefore merely estimates.

The little arrows in Fig. 1 show the ideal timing of the 6-year cycle in these figures.

If we adjust the figures for trend, you can see the 6-year waves more clearly. Such an adjustment has been made and the results plotted in Fig. 2.

Each point of the curve in Fig. 2 represents the percentage that the actual values, as shown by the solid line in Fig. 1, are of the trend as shown by the broken line in Fig. 1. In other words, Fig. 2 shows the values in Fig. 1 when the trend has been pulled straight as it were.

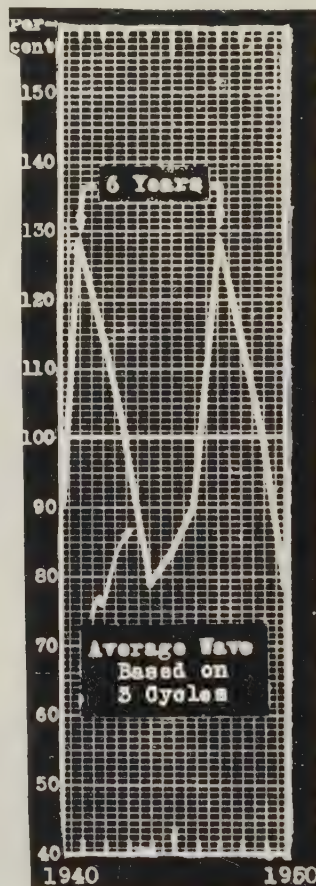
A zigzag has been added to Fig. 2 by means of a broken line to diagram the timing of the typical 6-year cycle in these figures.

Because the moving average loses three values at each end, Fig. 2 was originally plotted only to 1945. Now that figures for three more years are available it can be plotted accurately through 1948. This has been done by means of a heavy solid line.

Because I have now estimated the trend values for 1949, 1950, and 1951, we can also tentatively add three more values to the chart. This has been done by means of a broken line. These tentative or estimated values can be corrected later when additional figures become available.

The average cycle based on the three cycles that were available when this work was first done crests in 1947 and six years forward and backward from that date.

Troughs of the average or ideal cycle come three years after crests. The average wave is shown below.



Without knowing the sales for 1922 we cannot say for sure whether or not the sales in 1923 constituted a crest. If 1923 was a crest, it came exactly on time and so did the crests of 1929 and 1941. The crest of 1937 was two years late and the crest of 1948 was one year late. It is too soon to say for sure if the low of 1949 was the low of the present cycle, one year early. Of the four completed lows two came exactly on time, one was two years early and one was two years late.

The next crest is due ideally in 1953 after which, if the 6-year cycle in these figures continues, we can expect three years of decline.

erd

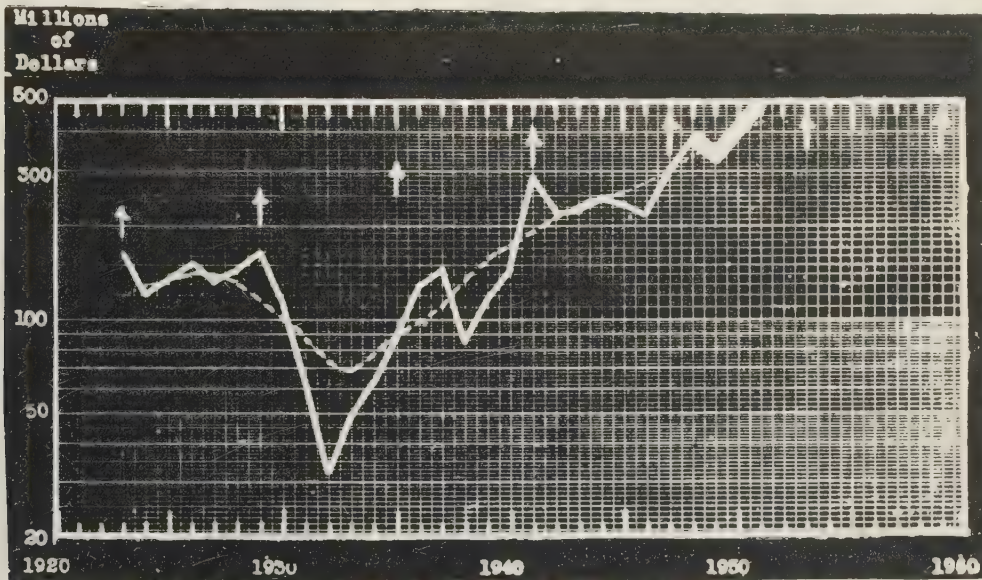


FIG. 1. YOUNGSTOWN SHEET AND TUBE COMPANY, TOTAL DOLLAR SALES, 1923-1951 TOGETHER WITH A SIX-YEAR MOVING AVERAGE TREND, (FIRST THREE AND LAST THREE VALUES ESTIMATED). ARROWS INDICATE TIME OF IDEAL HIGH OF SIX-YEAR CYCLE. RATIO SCALE.

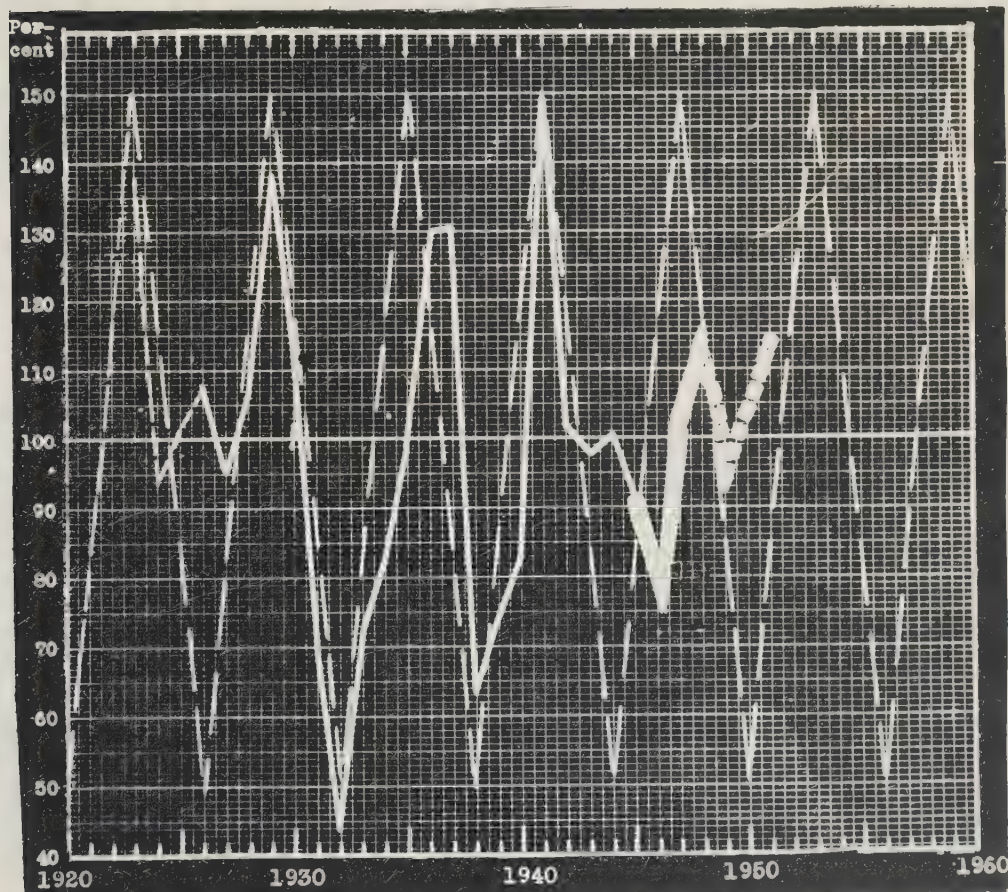


FIG. 2. THE SIX-YEAR CYCLE IN YOUNGSTOWN SHEET AND TUBE, TOTAL DOLLAR SALES, DEVIATIONS OF THE ACTUAL SALES FROM THEIR SIX-YEAR MOVING AVERAGE. BOLD LINE SHOWS HOW THE FORECAST HAS WORKED OUT

THE 6-YEAR CYCLE IN SWIFT & CO.

SALES of Swift and Company are available from 1892 forward. This series of figures is one of the longest studied. Values are plotted in Fig. 1 on the page opposite. Values for the last three years are plotted by means of a heavy line so that you can see how the sales of this company have behaved since the 6-year cycle in these figures was first discovered.

Fig. 1 also shows by means of a broken line the underlying growth trend of the sales of this company. The trend chosen was a 6-year moving average. Such a trend loses three values at each end of the series. These values have therefore been estimated. The estimates are shown by a dotted line.

The little arrows in Fig. 1 show the ideal timing of the 6-year cycle in these figures.

Each point of the curve in Fig. 2 represents the percentage that the actual values as shown by the solid line in Fig. 1 are of the trend as shown by the broken line in Fig. 1. In other words, Fig. 2 shows the values in Fig. 1 when the trend has been pulled straight as it were.

Fig. 2 shows Swift and Company dollar sales adjusted for trend. This manipulation enables you to see the 6-year cycle more clearly.

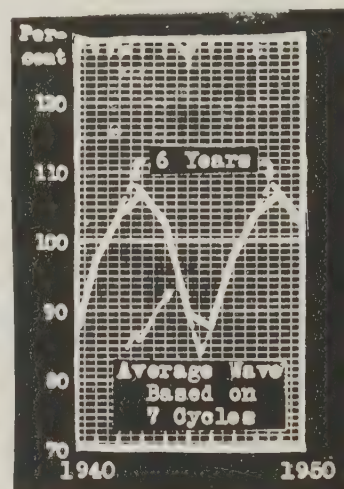
A zig zag has been added to Fig. 2 means of a broken line to diagram the timing of the typical 6-year cycle in these figures.

When Fig. 2 was first published it had to stop in 1945. Now that three more values are available we can bring this curve up to 1948. This has been done by means of a heavy line so that you can see more clearly how this cycle in these figures has worked out since discovery.

Also, because I have now estimated trend for 1949, 1950, and 1951, we can compute the percentages that the actual sales are of this estimated trend and continue Fig. 2 for three additional years. This has been done by means of a heavy broken line.

The average wave based on seven cycles is shown below. As you can see, it crests

midway between 1948 and 1949 and six years forward and backward from that time. Troughs of the ideal cycle fall three years after crests.



As the ideal cycle crests between years, no crest or trough will come exactly on time. Of the ten crests, five came half a year from perfect timing, and five came one and a half years from perfect timing.

It is too soon to know for certain whether or not the low of the present cycle came in 1950. Of the remaining nine lows six came within half a year of perfect timing. One came in 1896, a year and a half early. One (in 1912) came two and a half years late, and one (in 1907) came three and a half years late, just about where the crest should have been.

As you can see from the little chart inserted above, the typical 6-year wave in the sales of Swift and Company runs from 85% of trend to 109% of trend. The overall move is about 24% of trend in three years or about 8% a year.

This cycle has been extremely regular since about 1913.

The next crest of the ideal 6-year cycle in Swift and Company is due half way between 1954 and 1955. Things look good for dollar sales in Swift and Company for the near future if the 6-year cycle in these figures continues

erd

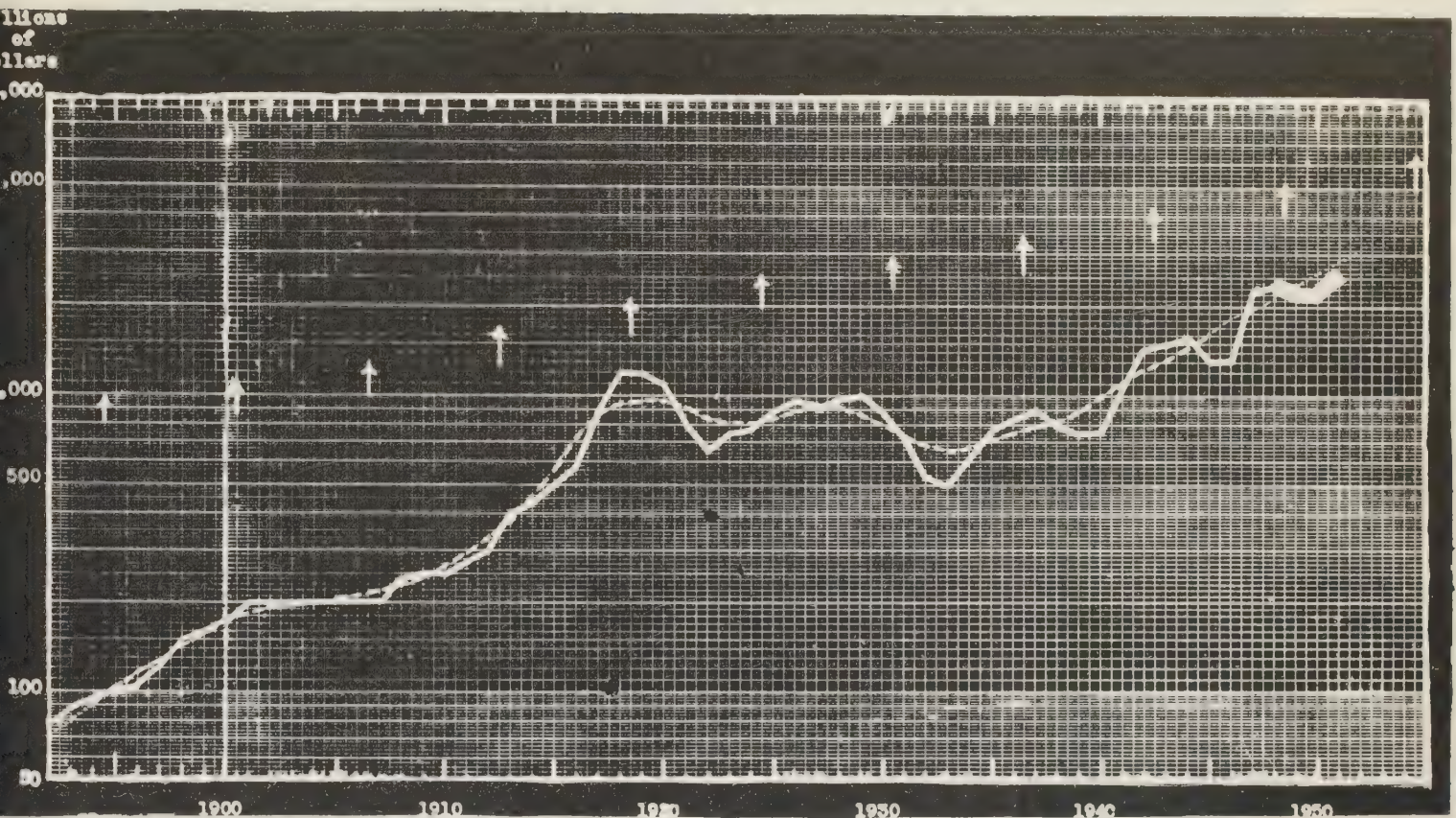


FIG. 1. SWIFT AND COMPANY, TOTAL DOLLAR SALES, 1892-1951, TOGETHER WITH A SIX-YEAR MOVING AVERAGE TREND (FIRST THREE AND LAST THREE VALUES ESTIMATED). ARROWS INDICATE TIME OF IDEAL HIGH OF SIX-YEAR CYCLE, RATIO SCALE.

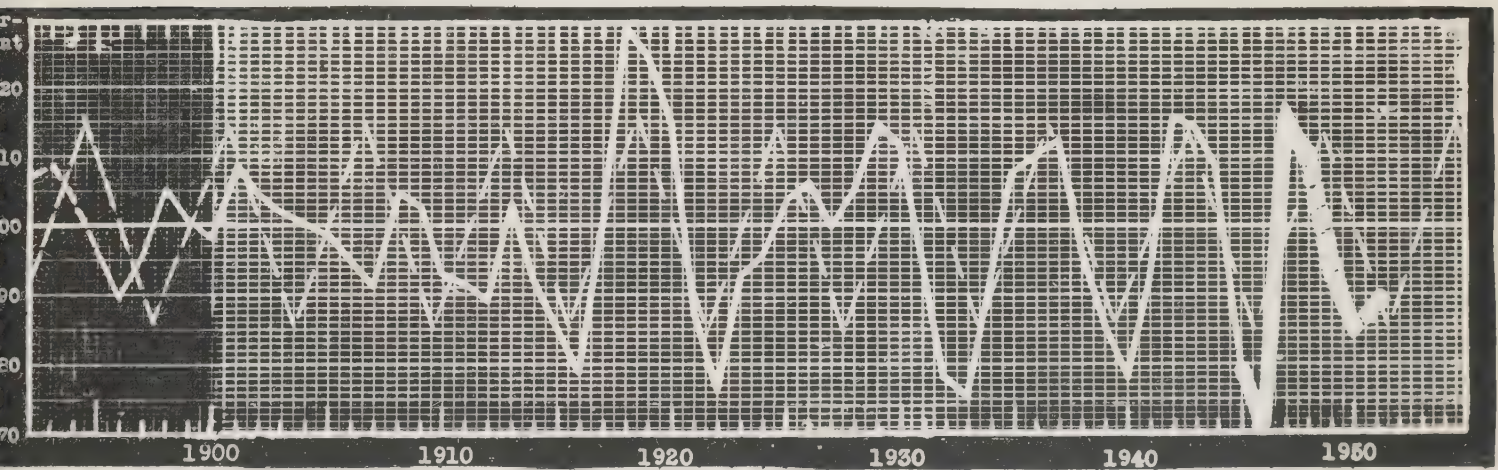


FIG. 2. THE SIX-YEAR CYCLE IN SWIFT AND COMPANY, TOTAL DOLLAR SALES, DEVIATIONS OF THE ACTUAL SALES FROM THEIR SIX-YEAR MOVING AVERAGE. BOLD LINE SHOWS HOW THE FORECAST HAS WORKED OUT.

Letters

The following letter serves as a supplement to an article by Mr. Pinkham called "Cycles in the Sales and Advertising of the Pinkham Medicine Company," which was printed in our report for January 1952.

Dear Mr. Dewey:

...You may be interested to know that the principal error which we made was to give the dominant cycle, 266 months (22 1/6 years), too much amplitude--45% instead of the 30% to which we have now reduced it...

Another error was that we tried to make the various rhythms fit our conception of the way cyclical forces should behave. We felt that cycles **had** to be equilateral, **had** to retain the same amplitude and length, **had** to be repetitive and never fade out or reverse themselves. We felt that unless these things were all true, cyclical forces would be neither measurable nor predictable; and any study of cycles would have no practical application.

It was not until we stopped trying to bend the cycles into our own preconceived patterns and, as a last resort, approached our investigations with an open mind, that we started to hit pay-dirt.

First, we grudgingly relaxed our stipulation that cycles must be equilateral, and moved the 266-month cycle trough back 33.25 months--1/8 of the cycle's length. We had long suspected that this might be the proper timing for this cycle and were further influenced by Garcia-Mata and Shaffner's statement that "the 11-year business cycles of our smoothed curve showed clearly a rise much slower and longer than the fall in the depression periods." (Foundation Reprint No. 10, page 15.)

The 6-year cycle has always asserted itself in our business. It is discernable in yearly figures back to 1887. It, as well as the 56-month cycle and cycle F, seemed to be generally equilateral--which

gave us some comfort.

We stuck to our stipulation that the amplitude of cycles in each rhythm **had** to be constant in order for cycles to have any commercial application; and, with the possible exception of 1919-20, we seem to have been justified in treating the amplitude in this manner. We have permitted the 56-month cycle to reverse itself and cycle E to change its length; but, as you will see from our description of these changes in the enclosed paper, there seems to be such a logical reason for this capriciousness that the erratic action of these cycles may eventually be completely predictable...

Sincerely yours,
Charles H. Pinkham

Lydia E. Pinkham Medicine Company
Lynn, Massachusetts

In answer I wrote as follows:

Dear Mr. Pinkham:

I agree with you fully that cycles can be lopsided and that the average time from trough to crest does not have to equal the average time from crest to trough.

Neither do cycles have to retain the same amplitude. The seasonal pattern of some businesses, for example, decreases its amplitude as the business gets bigger.

It is not even necessary, for purposes of prediction, that cycles retain the same length. All that is necessary is that if they change their length they change it in some orderly way. Finally some cycles do definitely reverse phase and give us crests where troughs "ought" to be and vice versa. This behavior always results when two cycles of similar wave length combine (see an article on this subject on pages 18, 19, and 20 of the report for December 1950).

Cordially yours,

INDEX, VOL. III, JANUARY--DECEMBER 1952

PAGE NUMBERS ARRANGED BY MONTH OF ISSUE

PAGES	1	36	JANUARY	PAGES	193	228	JUNE
"	37	80	FEBRUARY	"	229	260	SEPTEMBER
"	81	116	MARCH	"	261	292	OCTOBER
"	117	156	APRIL	"	293	332	NOVEMBER
"	157	192	MAY	"	333	364	DECEMBER

INDEX BY DEPARTMENT

ADDITIONS TO THE LIBRARY, 24, 58, 115, 191, 226
251-52, 290-91, 331
CONTENTS, INSIDE FRONT COVERS OF EACH ISSUE
DATA, 141
DIRECTOR'S LETTER, 3, 39, 83, 119, 159, 195,
231, 263, 295, 335
ERRATA, 363
FINANCIAL, 96

FOUNDATION AFFAIRS, 54, 185, 286, 325
HOW HAS IT WORKED OUT? 242, 282, 327, 330, 337
JOURNAL OF CYCLE RESEARCH, 110, 184, 301
LETTERS, 20, 55, 111, 186, 220, 245, 287, 354
QUESTIONS AND ANSWERS, 189, 224, 249
RESEARCH, 5, 42, 87, 162, 197, 233, 265, 297
SUPPLEMENTS, 25, 59, 253, 301, 355
TECHNICAL 18, 53, 97, 212, 278

INDEX OF SUPPLEMENTS

CYCLES IN THE SALES AND ADVERTISING OF THE PINKHAM MEDICINE COMPANY, BY CHARLES H. PINKHAM, 25
BENNER'S PROPHECIES OF FUTURE UPS AND DOWNS IN PRICES, BY SAMUEL BENNER, 59
INDEX, VOL. III, JANUARY--DECEMBER 1952 355
JOURNAL OF CYCLE RESEARCH, VOL. I, NO. 5, FALL 1952 301
PERIODIC INSPIRATION IN POETRY AND MUSIC, BY J. H. DOUGLAS WEBSTER 253

INDEX OF PUBLISHED ARTICLES

BENNER'S PROPHECIES OF FUTURE UPS AND DOWNS IN
PRICES, BY SAMMUEL BENNER, 59
THE BULL MARKET, BY VERYL L. DUNBAR, 265
CYCLE ANALYSIS FOR THE BEGINNER, 97
CYCLES IN THE FAR EAST, 53
CYCLES IN PIG IRON PRICES, SAMMUEL BENNER'S
FORECAST OF 1875, 50
CYCLES IN RANDOM NUMBERS, 9
CYCLES IN SALES AND ADVERTISING OF PINKHAM MEDICINE
COMPANY. A METHOD FOR EVALUATING ADVERTISING AND
PREDICTING SALES, 25
CYCLES IN THE STOCK MARKET, 42
CYCLES IN WOMEN'S DRESS FASHIONS, 131
THE EFFECT OF ATMOSPHERIC ELECTRICITY UPON BUSINESS,
BY ELLSWORTH HUNTINGTON, 130
THE 8-YEAR CYCLE IN CIGARETTE PRODUCTION, 330
THE 8-YEAR CYCLE IN INDUSTRIAL COMMON STOCKS, 5
THE 11.2-YEAR CYCLE IN INTERNATIONAL WAR, 135
FELLOWSHIP AWARDED TO LEONARD W. WING, 318
THE 57-YEAR CYCLE IN INTERNATIONAL CONFLICT, 210
THE 14-DAY CYCLE IN THE AMOROUSNESS OF WOMEN, 181
THE 14 2/3-YEAR CYCLE IN THE NUMBER OF STRIKES IN
THE UNITED STATES, 316
FREE SUNSPOT INFORMATION, 145
GUEST EDITORIAL, THE FOUNDATION FOR THE STUDY OF
CYCLES, 303
INDEX OF RAILROAD STOCK PRICES, 1831-1950, 143
INDUSTRIAL COMMON STOCK PRICES, 141
IS THERE A 17 1/3-YEAR PATTERN IN STOCKS, 205
MEMBERSHIP GROWING, 325
MORE ABOUT THE 46-MONTH CYCLE IN STOCK PRICES, 297
THE 9-YEAR CYCLE OF NEW MEMBERS IN THE PRESBYTERIAN
CHURCH IN THE UNITED STATES OF AMERICA, 244
THE 9-YEAR CYCLE IN SOCIAL DISEASE, 17
THE 9.6-YEAR CYCLE IN THE ACREAGE OF WHEAT, 327

THE 9.6-YEAR CYCLE IN ARIZONA TREE RINGS, 300
THE 9.6-YEAR CYCLE OF GAME ABUNDANCE, 180
THE 9.6-YEAR CYCLE IN LYNX ABUNDANCE, 284
THE 9.6-YEAR RHYTHM IN INDIAN RAINFALL, 306
AN OLD STUDY OF PIG IRON PRICE CYCLES, 277
THE 142-YEAR CYCLE IN WAR, 201
ORDER OUT OF CHAOS, 236
PERIODIC INSPIRATION IN POETRY AND MUSIC,
BY J. H. DOUGLASS WEBSTER, 254
PLANETARY EFFECTS ON SHORTWAVE RADIO,
BY JOHN H. NELSON, 87
POSSIBLE CYCLES IN INDUSTRIAL STOCK PRICES,
1871-1950, 166
POSSIBLE CYCLES IN PIG IRON PRICES, 1784-
1951, 207
POSSIBLE CYCLES IN RAILROAD STOCK PRICES,
1831-1950, 123
RATIO OR SEMI-LOGARITHMIC SCALE, 278
READER'S REACTIONS, 146
THE SEASONAL CYCLE AND ITS RELATION TO HUMAN
CHARACTERISTICS AND ABILITIES, 240
THE 700-YEAR CYCLE OF THE CLIMATE AND THE
AURORA BOREALIS, BY HIDEO NISHIOKA, 13
THE 17 3/4-YEAR CYCLE IN PIG IRON PRICES,
1748-1951, 162
THE 6-YEAR CYCLE, 337
THE 6-YEAR CYCLE IN ALLIS-CHALMERS, 342
THE 6-YEAR CYCLE IN THE SALES OF ARMOUR AND
COMPANY, 282, 352
THE 6-YEAR CYCLE IN JONES & LAUGHLIN, 344
THE 6-YEAR CYCLE IN THE SALES OF THE PITTSBURGH
PLATE GLASS COMPANY, 283, 348
THE 6-YEAR CYCLE IN SEARS, 346
THE 6-YEAR CYCLE IN SWIFT, 354
THE 6-YEAR CYCLE IN YOUNGSTOWN SHEET AND TUBE, 350

SOME NEGLECTED ASPECTS OF ACCIDENT PREVENTION, 16
 STANDARD MONTH NUMBERS, 319
 A STOCK MARKET FORECAST MADE IN 1912, 197
 TECHNIQUES INVOLVED IN THE CONSTRUCTION OF THE
 PERIODOGRAM OF RAILROAD STOCK PRICES, 1831-
 1950, 140
 TECHNIQUES INVOLVED IN THE DETERMINATION OF
 THE 11.2-YEAR CYCLE IN THE NUMBER OF
 INTERNATIONAL BATTLES, 140
 TECHNIQUES INVOLVED IN THE DETERMINATION OF
 THE 12.6-MONTH CYCLE IN THE SALES OF COMPANY
 G, 99
 THE 37-YEAR CYCLE, 4. THE 37-YEAR CYCLE IN THE
 FREQUENCY OF CHINESE EARTHQUAKES (SINCE
 200 A. D.), 14

TECHNIQUES INVOLVED IN THE JANUARY 1952 ARTICLE
 ENTITLED "THE 37-YEAR CYCLE IN THE FREQUENCY
 OF CHINESE EARTHQUAKES", 212
 THE 33-MONTH CYCLE IN RESIDENTIAL BUILDING
 CONSTRUCTION, 211
 THE 33-MONTH CYCLE IN THE SALES OF COMPANY G, 242
 THE 13-YEAR CYCLE IN AUTOMOBILE SALES, 271
 THE THREE-YEAR CYCLE IN INDUSTRIAL COMMON STOCK
 PRICES, 233
 THE 12.6-MONTH CYCLE IN THE SALES OF COMPANY
 G, 94
 THE USE OF WEIGHTED MOVING AVERAGES IN CYCLE
 ANALYSIS, 18
 WHAT MADE THE BENNER FORECAST TICK, 90
 WILL DUNBAR'S CYCLE STAND UP?, 267

INDEX OF BOOKS, PERIODICALS, AND ARTICLES REFERRED TO, INCLUDING SUPPLEMENTS

AMERICAN MEN OF SCIENCE, 185
 THE ANALYSIS OF ECONOMIC TIME SERIES, 10, 47
 THE ANNALIST, 265
 ANNALS OF MATHEMATICAL STATISTICS, 113
 APPLIED GENERAL STATISTICS, 97, 98
 ARCHIV FÜR METEOROLOGIE, GEOPHYSIK UND BIOKLIMA-
 TOLOGIE, 115
 ARCTIC ADVENTURE, 159
 THE AUK, 332
 BARRONS, 289
 BELL LABORATORIES RECORD, 155, 191
 BENNER'S PROPHECIES OF FUTURE UPS AND DOWNS IN
 PRICES, 59
 BETTER FOREMANSHIP--KEY TO PROFITABLE MANAGEMENT,
 16, 24
 "BIOELECTRIC CORRELATES OF EMOTIONAL STATES," 331
 BIOMETRICA, 113
 "THE BRITISH WHEAT PRICE CURVE AND THE WEATHER
 TRENDS SINCE 1260 A.D.," 115
 THE BULLETIN OF THE AMERICAN ASSOCIATION OF PETRO-
 LEUM GEOLOGISTS, 226
 BULLETIN AMERICAN METEOROLOGICAL SOCIETY, 191
 BULLETIN OF THE GEOLOGICAL SOCIETY OF AMERICA, 191
 "BUSINESS CYCLES IN THE UNITED STATES OF AMERICA,
 1919-1932," 114
 BUSINESS STATISTICS, 97
 "CAMBIAL FROST INJURIES AND MULTIPLE GROWTH
 LAYERS AT LUBBOCK, TEXAS," 24
 "THE CATHODE RAY SOUND SPECTROSCOPE," 155
 "CAUSATION OF THE 9- OR 10-YEAR SALMON CYCLE," 110
 "CLOUD SEEDING," 154
 COMMON STOCK INDEXES, 143, 166
 COMMUNICATIONS AND ELECTRONICS, 290
 THE CONNECTICUT STATE MEDICAL JOURNAL, 331
 "CONSTRUCTION OF THE CHARLES H. PINKHAM INDEX OF
 ADVERTISING EFFICIENCY," 28
 CONTEMPORARY REVIEW, 152
 "CONTRIBUTIONS TO THE STUDY OF OSCILLATORY TIME
 SERIES," 113
 "THE CURRENT STATUS OF DYNAMIC STABILITY THEORY,"
 290
 CYCLE ANALYSIS--THE MOVING AVERAGE, 99
 "CYCLE DOMINANCE AMONG THE FRASER SOCKEYE," 290
 "CYCLES PREDICT THE FUTURE," 24
 "CYCLES IN THE SALES AND ADVERTISING OF THE PINKHAM
 MEDICINE COMPANY," 25
 CYCLES--THE SCIENCE OF PREDICTION, 21, 34, 83, 86,
 108, 112, 119, 121, 122, 278, 289
 "DAILY VARIATIONS OF STANDING POTENTIAL DIFFERENCES
 IN HUMAN SUBJECTS," 226
 THE DECLINE OF THE WEST, 55
 DIE KRIEGSUND GEISTESPERIODEN IM VOLKERLEBEN UNDE
 VERKUNDIGUNG DES NACHSTEN WELTKRIEGES, 55
 "DISTRIBUTION OF THE CIRCULAR SERIAL CORRELATION
 COEFFICIENT FOR RESIDUALS FROM A FITTED FOURIER
 SERIES," 113
 "DISTRIBUTION OF THE SERIAL CORRELATION COEFFICIENT
 IN A CIRCULARLY CORRELATED UNIVERSE," 113
 ECOLOGICAL MONOGRAPHS, 58
 ECOLOGY, 24, 290

AN ECONOMETRIC APPROACH TO BUSINESS CYCLE PROBLEMS,"
 114
 ECONOMETRICA, 113
 ECONOMICS FLUCTUATIONS IN THE UNITED STATES, 114
 "THE EFFECT OF CLIMATE ON HUMAN BEHAVIOR IN HISTORY"
 137
 "EFFECT OF TEMPERATURE AND SEASON ON ENERGY RESOURCES
 OF THE ENGLISH SPARROW," 332
 THE ELECTRICAL FACTOR IN METABOLISM, 291
 "THE 11-YEAR SUNSPOT PERIOD, SECULAR PERIODS OF SOLAR
 ACTIVITY, AND SYNCHRONOUS VARIATIONS IN TERRES-
 TRIAL PHENOMENA," 212
 EMOTIONAL CYCLES IN MAN, 24
 "ENGINEERING APPLICATIONS OF STATISTICAL EXTREMES,"
 58
 "ENGLISH AURORAE OF A.D. 1600/61," 251
 "FLUCTUATION OF NON-FOREST ANIMAL POPULATIONS IN
 THE UPPER MISSISSIPPI BASIN," 58
 "GEOLOGICAL CALENDAR--INDICATIONS OF PERIODICITY
 IN NATURE AND SUCCESSION OF GEOLOGICAL
 PERIODS," 226
 "GLACIAL CLAYS IN STEEP ROCK LAKE, ONTARIO,
 CANADA," 191
 GLACIER FLUCTUATION IN NORTHWESTERN NORTH AMERICA
 WITHIN THE PAST SIX CENTURIES, 252
 "HISTORIC FIRSTS: SUN SPOTS AND RADIO," 191
 IMPORTANT INTERFERENCES WITH NORMALS IN WEATHER
 RECORDS, ASSOCIATED WITH SUNSPOT FREQUENCY, 251
 INDUSTRIAL DIGEST, 277, 291
 JAPAN AND THE WORLD, 53
 JOURNAL OF THE AMERICAN STATISTICAL ASSOCIATION, 113
 JOURNAL OF THE BRITISH ASTRONOMICAL ASSOCIATION, 251
 JOURNAL OF CYCLE RESEARCH, 18, 20, 79, 100, 112, 126,
 162, 166, 184, 196, 224, 301
 JOURNAL OF HUMAN ECOLOGY, 154, 115
 JOURNAL OF MEDICAL PSYCHOLOGY, 20
 JOURNAL OF THE ROYAL STATISTICAL SOCIETY, 113
 THE JOURNAL OF WILDLIFE MANAGEMENT, 290
 LINEAR COMPUTATIONS, 155
 MALE AND FEMALE, 263
 MARRIED LOVE, 181
 MECHANIX ILLUSTRATED, 24
 "A METHOD AND ITS APPLICATION TO INVESTMENT
 ACTIVITY," 114
 THE MIND AND SOCIETY, 55
 "MORE ON WEATHER CYCLES AND THEIR CAUSES," 291
 "MUSIC HISTORY IN FIVE FIVE-HUNDRED-YEAR CYCLES," 154
 "MY GRANDFATHER, PETER COOPER," 155
 NATURAL HISTORY, 58
 "A NATURAL METHOD OF CHILD-PLANNING," 24
 "A NEW DEVICE FOR SAMPLING LAKE SEDIMENTS," 226
 "A NEW FORM OF PERIODOGRAM," 110, 166
 "A NOTE ON A MAXIMUM LIKELIHOOD ESTIMATE," 113
 "ON THE INTERPRETATION OF THE RESULTS OF PERIODOGRAM
 ANALYSIS AND OF SELF-CORRELATION," 191
 "ON THE THEORETICAL SPECIFICATION AND SAMPLING
 PROPERTIES OF AUTOCORRELATED TIME SERIES," 113
 "ON THE THEORY OF TESTING SERIAL CORRELATION," 113
 PERIODIC INSPIRATION IN POETRY AND MUSIC, 253
 PERSONNEL, 16

- "PIG IRON PRICES DUE TO RISE," 291
 "PLANETARY POSITION EFFECT ON SHORT-WAVE SIGNAL QUALITY," 290
 POPULAR ASTRONOMY, 155
 "POPULATION CYCLES AND RANDOM OSCILLATIONS," 290
 RADIO TODAY, 325
 RCA REVIEW, 88
 THE READERS DIGEST, 24, 155
 RECURRING CYCLES OF FASHION, 131
 REVIEW OF ECONOMIC STATISTICS, 265
 "REVIEW OF KENDALL: CONTRIBUTIONS TO THE STUDY OF OSCILLATORY TIME SERIES," 113
 SCIENCE, 289
 THE SCIENCE OF MUSICAL SOUNDS, 189, 220
 SCIENTIFIC AMERICAN, 154, 155
 SEASON OF BIRTH, 240, 252
 "SECRETS OF THE OCEAN BED--DATING THE CHANGING CLIMATE OF THE PAST," 115
 SEDIMENTARY PETROLOGY, 226
 THE 700-YEAR CYCLE IN JAPANESE CLIMATE, 13
 A SHORT HISTORY OF SCIENCE, 239
 "SHORTWAVE RADIO PROPAGATION CORRELATION WITH PLANETARY POSITIONS," 88
 "A SIGNIFICANCE TEST FOR TIME SERIES," 113
 SKANDINAVISK AKTUARISTIDSKRIFT, 113
 "THE SOLAR FACULAE," 155
 SOLVING PUBLIC RELATIONS PROBLEMS, 145
 "SOME ASPECTS OF THE TIME CORRELATION PROBLEM IN REGARD TO TESTS OF SIGNIFICANCE," 113
 STATISTICAL INFERENCE IN DYNAMIC ECONOMICS MODELS, 114
 "A STATISTICAL STUDY OF THE RECORDS OF SALMON FISHING ON THE RESTIGOUCHE RIVER," 116
 A STUDY IN THE ANALYSIS OF STATIONARY TIME SERIES, 113
 "A STUDY OF THE AUTOREGRESSIVE NATURE OF TIME SERIES USED FOR TIMBERGEN'S MODEL OF THE ECONOMIC SYSTEM OF THE UNITED STATES 1919-1932," 113
 "THE SUN'S HEAT AND TRADE ACTIVITY," 152
 TECHNICAL BULLETIN No. 3, CYCLE ANALYSIS: A DESCRIPTION OF THE HOSKINS TIME CHART, 297
 TECHNICAL BULLETIN No. 4, CYCLE ANALYSIS: THE MOVING AVERAGE, 18, 215
 "TESTING CYCLES FOR STATISTICAL SIGNIFICANCE--APPLYING THE BARTELS TEST OF SIGNIFICANCE TO A TIME SERIES ANALYSIS," 184
 "TESTING THE SIGNIFICANCE OF CORRELATION BETWEEN TIME SERIES," 113
 THOSE WERE THE DAYS, 155
 THE TIMES, 115
 TRANSACTIONS OF THE NEW YORK ACADEMY OF SCIENCES, 58
 "TREE RINGS AND SUNSPOTS," 155
 THE NEW YORK HERALD TRIBUNE, 56
 "THE 37-YEAR CYCLE IN THE FREQUENCY OF CHINESE EARTHQUAKES," 212
 "THE 22-YEAR CYCLE IN THE ADVERTISING EFFICIENCY OF THE LYDIA E. PINKHAM MEDICINE COMPANY," 28
 "UPLAND GAME IN WESTERN CANADA," 180, 191
 THE VARIATE DIFFERENCE METHOD, 113
 WATER AND SEWAGE WORKS, 291
 WAR CYCLES AND THE 6-YEAR CYCLE IN COTTON PRICES, 1731-1949, 110
 THE WAY TO GAME ABUNDANCE, 58
 WHO'S WHO IN AMERICA, 185
 "WHY DO WE SOMETIMES GET NONSENSE CORRELATIONS BETWEEN TIME SERIES," 113
 WORKERS' EMOTIONS IN SHOP AND HOME, 16
 WORLD-ALMANAC, 57
 NEW YORK WORLD-TELEGRAM, 57
 THE YALE JOURNAL OF BIOLOGY AND MEDICINE, 226
 YOU AND YOUR PUBLIC, 145
 "ÜBER EINE NEUE BIOLOGISCH WIRKSAME KOMPONENTE DER SONNENSTRABLUNG. BEITRAG ZU EINER EXPERIMENTELLEN GRUNDLAGE DER HELIOBIOLOGIE," 115

INDEX BY NAME OF PERSONS

- ABBAY, R. I. JR., 166, 188
 ABBOT, CHARLES GREELEY, 2, 38, 158, 82, 118, 194, 230, 251, 262, 301, 334
 ABBOTT, W. N., 291
 ADAMSON, GORDON, 56
 ALLEN, WARREN DWIGHT, 154
 AMORY, COPLEY, 2, 38, 82, 118, 158, 194, 230, 259, 262, 302, 334
 ANDERSON, C. N., 191
 ANDERSON, R. L., 113
 ANDERSON, T. W., 113
 ANTEVS, ERNST, 191
 ANTHONY, HAROLD ELMER, 2, 4, 38, 58, 82, 118, 158, 194, 230, 262, 301, 334
 ARMSTRONG, CHARLES E., 184
 BAEKELAND, GEORGE, 2, 38, 82, 89, 118, 158, 194, 230, 262, 302, 334
 BALLIET, KARL E., 152
 BARTSTOW, RALPH, 111
 BARTLETT, M. S., 113
 BELDING, D. L., 116
 BENNER, SAMUEL, 39, 50, 51, 52, 59, 60, 61, 90, 91, 92, 93, 207, 222, 231, 288
 BIGELOW, R. P., 239
 BOUCHER, FRANÇOIS, 132
 BOTHWELL, FRANK E., 290
 BOWEN, HAROLD GARDINER, 2, 38, 82, 118, 158, 194, 230, 262, 302, 334
 BRANDOW, G. E., 211
 BROOKS, 53
 BRUMBAUGH, M. A., 97
 BURNETT, VERNE, 118, 145, 158, 194, 230, 262, 302, 334
 BURR, H. S., 226
 CALDWELL, O. H., 335
 CAMSELL, CHARLES, 2, 38, 82, 118, 158, 194, 230, 262, 302, 334
 CHANDLER, W. D., 290
 CHU, 53
 CLARK, J. H., 88
 CLAYTON, HENRY HELM, 88
 CLOUGH, W. C., 15, 191, 212, 213, 215
 COLE, LAMONT C., 290
 COMPTON, ARTHUR H., 335
 COOLEY, DONALD S., 24
 COOPER, PATRICK ASHLEY, 2, 38, 82, 118, 158, 194, 230, 262, 302, 334
 CORTELYOU, HERMAN P., 23, 186, 187
 COWDEN, DUDLEY J., 97
 COWLES, ALFRED, 112, 143, 166
 CROXTON, FREDERICK E., 97
 DAKIN, E. F., 21, 41, 83, 121, 122, 278
 DAVIS, HAROLD T., 10, 11
 DAVIS, K. H., 155
 DUNBAR, VERYL L., 264, 265, 267, 287, 297
 DOUGLASS, A. E., 155
 DREW, WILLIAM N., 232, 236, 239
 DWYER, PAUL S., 155
 EINSTEIN, ALBERT, 335
 ELIAS, MAXIM K., 226
 FERRIE, R. M., 180, 191
 FISHBEIN, MORRIS, 24
 FORBES, W. CAMERON, 2, 38, 82, 118, 158, 194, 230, 262, 302, 334
 FRAGONARD, JEAN HONORÉ, 132
 FREEMAN, WILLIAM B., 246
 FREUCHEN, PETER, 159
 GARCIA-MATA, CARLOS, 152
 GEORGE IV, 134
 GILLETTE, HALBERT P., 236, 291
 GLOCK, WALDO S., 24
 GRANGE, BYRON, 58
 GRANT MADISON, 53
 GUMBEL, E. J., 58
 HEINES, NEAL J., 145, 155
 HERSEY, REXFORD, 16, 17, 24
 HEWITT, EDWARD R., 155
 HIROTA, 212
 HOOVER, HERBERT, 160
 HOSKINS, CHAPIN, 57, 161, 219, 336
 HUGHEY, VEDDER, 5, 21, 22, 23, 36, 80, 119, 126, 148, 151, 246

HUNTINGTON, ELLSWORTH, 53, 88, 130 153, 240 252
 HUNTSMAN, A. G., 110
 HUXLEY, JULIAN SORELL, 2 38, 82, 118, 158, 194, 230, 262, 302, 334
 IRWIN, RICHARD D., 97
 JAGGAR, THOMAS A., 289
 JAMES, FRANK CYRIL, 2, 38, 82, 118, 158, 194, 230, 262, 302, 334
 JAMES, S. F., 113
 JEVONS, HERBERT S., 152
 JEVONS, WILLIAM S., 152
 JOHNSON, ALVIN, 17
 JONES, WEBSTER N., 158, 185, 194, 230, 262, 302, 334
 KAISER WILLIAM II, 223
 KANDA, 53
 KELLOGG, L. S., 97
 KENDALL, M. C., 113
 KENDEIGH, S. CHARLES, 332
 KLEIN, L. R., 114
 KOOPMANS, TJALLING C., 112, 114
 KONDRATIEFF, N. D., 57
 LAWRENCE, DONALD B., 252
 LECLERC, SÉBASTIEN, 132
 LEIPNIK, R. B., 113
 MACDOUGAL, DANIEL TREMBLY, 2, 38, 82 118, 158, 194, 230, 262, 302, 334
 MALINOWSKI, ALEXANDER, 166, 297, 233
 MALINOWSKI, ALLA, 131, 184
 MEAD, MARGARET, 263
 MENDELEJEFF, D. I., 239
 MEWES, B., 55
 MEWES, RUDOLF, 223
 MILLER, DAYTON C., 220
 MILLER, GARDNER B., 20, 21, 22
 MODELL, M., 247
 MOORE, G., 113
 MUSHAM, H. A., 56
 MYERS, W. J., 211
 NELSON, CARL W., 89
 NELSON, JOHN H., 87, 89, 290
 NISHIOKA, HIDEO, 4, 13, 53, 291
 ORCUTT, G. H., 113
 PARETO, VILFREDO, 55
 PEARSON, F. A., 211
 PEARY, ROBERT EDWIN, 160
 PHELPS, E. B., 116
 PINKHAM, CHARLES H., 4 26, 114, 356
 PINKHAM, LYDIA E., 28, 114
 PROCKER, ANTHONY, 222

RAVITZ, L. J., 226, 331, 332
 RAYMOND, PAUL C., 55
 RICKER, WILLIAM E., 290
 ROESSLE, GERTRUDE, 20
 RUMRILL, H. B., 155
 RUSH, J. H., 155
 ST. JOHN, D. T., 57
 SANBORN, G. M., 220
 SANFORD, FERNANDO, 88
 SATTERTHWAITE, FRANK W., 148
 SCHOVE, D. JUSTIN, 53, 251
 SEDGWICK, W. T., 239
 SHAPLEY, HARLOW, 2, 38, 82
 SHELFORD, V. E., 58
 SHERMAN, HOWARD R., 150
 SHIRAISHI, T., 53
 SPENGLER, OSWALD, 223
 STETSON, HARLAN T., 110, 331
 STEWART, JOHN Q., 159, 230, 262, 286, 302, 334
 STOKES, W. E. D., 205, 206, 288
 STOPES, MARIE C., 181
 TAKATA, MAKI, 115
 TAYLOR, H. W., 239
 TINBERGEN, J., 114
 TINTNER, G., 113
 TUFTS, CHARLES G., 291
 TURNER, H. H., 212
 UVISAKAVSIK, 159, 160
 VOIGT, J. READ, 223
 VONNEGUT, BERNARD, 154
 WALLIS, W. A., 113
 WATTEAU, ANTOINE, 132
 WEBSTER, J. H. DOUGLAS, 253, 254
 WELLS, H. G., 159
 WHEELER, RAYMOND H., 24, 57, 115, 135, 137, 139, 140, 201, 202, 204, 259
 WHITFORD, WARREN, 41, 83, 86, 119, 121
 WILSON, IRA T., 226
 WING, LEONARD, 18, 184, 318
 WISEMAN, J. D., 115
 WOLD, H., 113
 WOLF, MAX, 251
 WOOD, SYDNEY MAKEPEACE, 154
 WOODRUFF, LEWIS M., 222
 YEATMAN, W. C., 19, 49
 YOTHERS, W. W., 289
 YOUNG, AGNES BROOKS, 131
 YULE, G. U., 113

INDEX BY CYCLE LENGTH

14-DAY CYCLE

--IN AMOROUSNESS OF WOMEN,
181-3

28-DAY CYCLE

--IN WOMEN'S TEMPERATURE, 24

35-DAY CYCLE

--IN EMOTIONS OF MALE WORKERS,
16

5.1-MONTH CYCLE

--IN INDUSTRIAL COMMON STOCK
PRICES 174-8

5.3-MONTH CYCLE

--INDUSTRIAL COMMON STOCK
PRICES, 174-8

5.6-MONTH CYCLE

--IN INDUSTRIAL COMMON STOCK
PRICES, 174-8

5.8-MONTH CYCLE

--IN INDUSTRIAL COMMON STOCK
PRICES, 176-8

5.9-MONTH) CYCLE

6.0-MONTH)
--IN INDUSTRIAL COMMON STOCK
PRICES, 174-8

6.3-MONTH) CYCLE

6.4-MONTH)

--IN INDUSTRIAL COMMON STOCK
PRICES, 174-8

6.5-MONTH CYCLE

--IN INDUSTRIAL COMMON STOCK
PRICES, 174, 175, 178

6.7-MONTH) CYCLE

6.8-MONTH)
--IN INDUSTRIAL COMMON STOCK
PRICES, 174-8

7.5-MONTH) CYCLE

7.6-MONTH)
--IN INDUSTRIAL COMMON STOCK
PRICES, 174-8

7.8-MONTH CYCLE

--IN INDUSTRIAL COMMON STOCK
PRICES, 174, 175, 178

8-MONTH (.667-YEAR)) CYCLE

8.1-MONTH)
--IN INDUSTRIAL COMMON STOCK
PRICES, 174-8

--IN STOCK PRICES, 239

8.16-MONTH (.680-YEAR) CYCLE
--THEORETICAL, 239

8.2-MONTH CYCLE

--IN RAILROAD STOCK PRICES,
197-9

8.3-MONTH) CYCLE

8.5-MONTH) CYCLE
--IN INDUSTRIAL COMMON STOCK
PRICES, 174-8

8.89-MONTH (.733-YEAR) CYCLE

--IN STOCK PRICES, 239

8.82-MONTH (.735-YEAR) CYCLE

--THEORETICAL, 239

9.2-MONTH CYCLE

--IN INDUSTRIAL COMMON STOCK
PRICES, 174-8

9.3-MONTH CYCLE

--IN INDUSTRIAL COMMON STOCK
PRICES, 176-8

9.9-MONTH CYCLE

--IN INDUSTRIAL COMMON STOCK
PRICES, 176-8

10.2-MONTH)

10.3-MONTH)
CYCLE

10.5-MONTH)

10.6-MONTH)
--IN INDUSTRIAL COMMON STOCK
PRICES, 168, 169, 172-8

10.7-MONTH)

10.8-MONTH) CYCLE
10.9-MONTH)

--IN INDUSTRIAL COMMON STOCK PRICES, 172-8
 10 96-MONTH (.913-YEAR) CYCLE
 --IN STOCK PRICES, 239
 11-MONTH CYCLE
 --IN CHINESE EARTHQUAKES, 15
 11.09-MONTH (.924-YEAR) CYCLE
 --THEORETICAL, 239
 11.1-MONTH)
 11.2-MONTH) CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 168, 169, 172-5, 178
 11.4-MONTH)
 11.5-MONTH) CYCLE
 11.6-MONTH)
 --IN INDUSTRIAL COMMON STOCK PRICES, 168-71 174-8
 11.9-MONTH)
 12-MONTH) CYCLE
 12.1-MONTH)
 --IN INDUSTRIAL COMMON STOCK PRICES, 168-73, 176-78
 12.5-MONTH) CYCLE
 12.6-MONTH)
 --IN INDUSTRIAL COMMON STOCK PRICES, 168-71, 178
 --IN THE SALES OF COMPANY G, 94-96, 99-109
 12.8-MONTH) CYCLE
 12.9-MONTH)
 --IN INDUSTRIAL COMMON STOCK PRICES, 170-3, 178
 13.1-MONTH)
 13.2-MONTH) CYCLE
 13.3-MONTH)
 --IN INDUSTRIAL COMMON STOCK PRICES, 168-71, 174-8
 13.6-MONTH)
 13.7-MONTH) CYCLE
 13.8-MONTH)
 13.9-MONTH)
 --IN INDUSTRIAL COMMON STOCK PRICES, 168-73, 178
 14.4-MONTH) CYCLE
 14.5-MONTH (1.20-YEAR)) CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 168-73, 178
 --IN STOCK PRICES, 239
 14.47-MONTH (1.206-YEAR) CYCLE
 --THEORETICAL, 239
 14.6-MONTH)
 14.7-MONTH) CYCLE
 14.9-MONTH)
 --IN INDUSTRIAL COMMON STOCK PRICES, 168-73, 178
 15-MONTH CYCLE
 --IN STOCK PRICES, 288
 15.3-MONTH) CYCLE
 15.5-MONTH)
 --IN INDUSTRIAL COMMON STOCK PRICES, 168, 169, 172, 173, 178, 270
 16.4-MONTH) CYCLE
 16.8-MONTH)
 --IN INDUSTRIAL COMMON STOCK PRICES, 168-71, 178
 17.3-MONTH) CYCLE
 17.8-MONTH)
 --IN INDUSTRIAL COMMON STOCK PRICES, 168-9, 172-3, 178
 17.64-MONTH (1.47-YEAR) CYCLE
 --IN STOCK PRICES, 239
 18.3-MONTH)
 18.7-MONTH) CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 168-73, 178
 18.34-MONTH (1.528-YEAR)
 --THEORETICAL, 239
 19-MONTH CYCLE
 --IN THE ADVERTISING EFFECTIVENESS OF THE PINKHAM

MEDICINE COMPANY, 30, 32
 19.6-MONTH CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 168-71, 178
 21.6-MONTH CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 168-9, 178
 22.2-MONTH) CYCLE
 22.7-MONTH)
 --IN INDUSTRIAL COMMON STOCK PRICES, 170-3, 178
 23-MONTH CYCLE
 --IN COMMON STOCK PRICES, 270, 288, 297
 23.2-MONTH)
 23.7-MONTH) CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 168-73, 178
 24.3-MONTH CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 172-3, 178
 24.24-MONTH (2.02-YEAR) CYCLE
 --IN STOCK PRICES, 239
 24.48-MONTH (2.040-YEAR) CYCLE
 --THEORETICAL, 239
 24.9-MONTH CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 170-3, 178
 25.8-MONTH CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 168-9, 178
 27.8-MONTH CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 170-1, 178
 28.6-MONTH CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 168-9, 178
 29.1-MONTH CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 172-3, 178
 29.64-MONTH (2.470-YEAR) CYCLE
 --THEORETICAL, 239
 30.2-MONTH) CYCLE
 30.5-MONTH)
 --IN INDUSTRIAL COMMON STOCK PRICES, 170-3, 178
 30.12-MONTH (2.51-YEAR) CYCLE
 --STOCK PRICES, 239
 31.2-MONTH CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 168-9, 178
 32.64-MONTH (2.72-YEAR)
 32.85-MONTH (2.74-YEAR) CYCLE
 33 -MONTH (2.75-YEAR)
 --IN RESIDENTIAL BUILDING CONSTRUCTION, 211, 364
 --IN SALES OF COMPANY G, 242-3
 --IN STOCK PRICES, 239
 --THEORETICAL, 239
 34.2-MONTH CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 170-3, 178
 35.27-MONTH (1.939-YEAR) CYCLE
 --THEORETICAL, 239
 35.4-MONTH CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 233-5
 35.6-MONTH CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 168, 169, 178
 35 76-MONTH (2.98-YEAR) CYCLE
 --IN STOCK PRICES, 239
 3-YEAR (36-MONTH) CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 233-5
 3.02-YEAR (36.2-MONTH) CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 172, 173, 178
 3.25-YEAR (39-MONTH) CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 172, 173, 178

3.33-YEAR (40-MONTH) CYCLE
 --IN PIG IRON PRICES, 277
 3.40-YEAR (40.80-MONTH) CYCLE
 --IN STOCK PRICES, 239
 3.42-YEAR (41-MONTH) CYCLE
 --IN ATMOSPHERIC ELECTRICITY, 130
 --IN INDUSTRIAL COMMON STOCK PRICES, 42, 44, 45, 49, 233, 297
 --IN RAILROAD STOCK PRICES, 197-9
 --IN STOCK PRICES, 130, 149, 152, 287
 --IN U.S. ECONOMIC PHENOMENA, DISCOVERY OF, 152
 3.450-YEAR (41.40-MONTH) CYCLE
 --THEORETICAL, 239
 3.47-YEAR (41.6-MONTH) CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 168-71, 178
 3 58-YEAR (43-MONTH) CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 172, 173, 178
 3.700-YEAR (44.40-MONTH) CYCLE
 --THEORETICAL, 239
 3.79-YEAR (45.48-MONTH) CYCLE
 --IN STOCK PRICES, 239
 3.8-YEAR (45.60-MONTH) CYCLE
 --IN STOCK PRICES, 129
 3.83-YEAR (46-MONTH)
 3.88-YEAR (46.6-MONTH)
 3.89-YEAR (46.7-MONTH)
 3.9-YEAR (47-MONTH)
 --IN INDUSTRIAL COMMON STOCK PRICES, 166-7, 172-3, 178
 --IN RAILROAD STOCK PRICES, 126-9, 178
 --IN STOCK PRICES, 265-70, 287-8, 297
 4-YEAR (48-MONTH) CYCLE
 --IN STOCK PRICES, 239
 4.05-YEAR (48.6-MONTH)) CYCLE
 4.08-YEAR (49-MONTH)) CYCLE
 --IN ADVERTISING EFFECTIVENESS OF PINKHAM MEDICINE COMPANY, 30, 32
 --IN RAILROAD STOCK PRICES, 126-9, 178
 --IN PIG IRON PRICES, 207-9
 4.1-YEAR (49.2-MONTH) CYCLE
 --IN PIG IRON PRICES, 207-9
 4.2-YEAR (50.40-MONTH) CYCLE
 --INDUSTRIAL COMMON STOCK PRICES, 166-9
 --IN PIG IRON PRICES, 207-9
 4.38-YEAR (52.6-MONTH) CYCLE
 --IN STOCK PRICES, 297
 4.4-YEAR (52.80-MONTH)) CYCLE
 4.42-YEAR (53-MONTH)) CYCLE
 --IN ADVERTISING EFFECTIVENESS OF PINKHAM MEDICINE COMPANY, 30, 32
 --IN INDUSTRIAL COMMON STOCK PRICES, 166, 167, 178
 --IN RAILROAD STOCK PRICES, 126-9, 178
 4.5-YEAR (54-MONTH) CYCLE
 --IN INDUSTRIAL COMMON STOCK PRICES, 166, 167, 178
 --IN PIG IRON PRICES, 207-9
 --IN RAILROAD STOCK PRICES, 126-9, 178
 4.591-YEAR (55.09-MONTH) CYCLE
 --THEORETICAL, 239
 4.6-YEAR (55.20-MONTH) CYCLE
 --IN RAILROAD STOCK PRICES, 126-9, 178
 4.7-YEAR (56.40-MONTH) CYCLE
 --IN PIG IRON PRICES, 207-9
 4.78-YEAR (57.36-MONTH) CYCLE
 --IN STOCK PRICES, 239

4.8-YEAR (57.60-MONTH) CYCLE
 --IN INDUSTRIAL COMMON STOCK
 PRICES, 166, 167, 170, 171,
 178

--IN PIG IRON PRICES, 207-9
 --IN RAILROAD STOCK PRICES,
 126-9, 178

4.830-YEAR (57.96-MONTH) CYCLE
 --THEORETICAL, 239

4.88-YEAR (58.56-MONTH))

4.90-YEAR (58.89-MONTH)) CYCLE

4.92-YEAR (59-MONTH))

--IN ADVERTISING EFFECTIVENESS
 OF THE PINKHAM MEDICINE
 COMPANY, 30, 32

--IN INDUSTRIAL COMMON STOCK
 PRICES, 166, 167, 178

--IN RAILROAD STOCK PRICES,
 126-9

--IN STOCK PRICES, 129, 239

5-YEAR (60-MONTH) CYCLE

--IN PIG IRON PRICES, 297-9

--IN RAILROAD STOCK PRICES,
 126-9, 178

5.1-YEAR (61.20-MONTH) CYCLE

--IN PIG IRON PRICES, 207-9

--IN RAILROAD STOCK PRICES,
 126-9, 178

5.3-YEAR (63.60-MONTH) CYCLE

--IN INDUSTRIAL COMMON STOCK
 PRICES, 166, 167, 178

--IN PIG IRON PRICES, 207-9

--IN RAILROAD STOCK PRICES,
 126-9, 178

5.4-YEAR (64.80-MONTH) CYCLE

--IN INDUSTRIAL COMMON STOCK
 PRICES, 166, 167, 178

--IN PIG IRON PRICES, 207-9

--IN RAILROAD STOCK PRICES,
 126-9, 178

5.5-YEAR (66-MONTH) CYCLE

--IN RAILROAD STOCK PRICES,
 126-9, 178

5.6-YEAR (67-MONTH) CYCLE

--IN ADVERTISING EFFECTIVENESS
 OF PINKHAM MEDICINE Co.,
 30, 32

--IN RAILROAD STOCK PRICES,
 126-9, 178

5.7-YEAR (68.40-MONTH) CYCLE

--IN INDUSTRIAL COMMON STOCK
 PRICES, 172-3, 176-8

5.8-YEAR (69.60-MONTH) CYCLE

--IN PIG IRON PRICES, 207-9

5.899-YEAR (70.79-MONTH) CYCLE

--THEORETICAL, 239

5.9-YEAR (70.80-MONTH) CYCLE

--IN PIG IRON PRICES, 207-9

--IN RAILROAD STOCK PRICES,
 126-9, 178

6-YEAR (72-MONTH) CYCLE

--IN THE ADVERTISING EFFECTIVE-
 NESS OF PINKHAM MEDICINE
 COMPANY, 30, 32

--IN ALLIS CHALMERS MFG.,
 DOLLAR SALES BILLED, 337,
 342-3

--IN AMERICAN VISCOSE CORP.,
 SHIPMENTS IN POUNDS, 337

--IN ARMOUR AND CO., DOLLAR SALES
 282, 337, 338,

--IN ARMCO STEEL CORP., DOLLAR
 SALES, 337

--IN AUTOMOBILE SALES, 271, 275,
 276

--IN BAROMETRIC PRESSURE AT
 NEW YORK CITY, 337

--IN BETHLEHEM STEEL CO., PRODUC-
 TION IN NET TONS, 337

--IN CONTINENTAL OIL CO.,

GROSS OPERATING INCOME, 337

--IN COTTON PRICES, 337

--IN COTTON PRODUCTION, 337

--IN E. I. DU PONT DE NEMOURS

& CO., DOLLAR SALES, 337

--IN GENERAL ELECTRIC CO.,

ORDERS RECEIVED,

123, 337, 340

--IN B.F. GOODRICH CO., DOLLAR

SALES, 337

--IN GOODYEAR TIRE & RUBBER CO.,

NET DOLLAR SALES, 337,

--IN INDUSTRIAL COMMON STOCK

PRICES, 166-7, 178, 337

--IN INLAND STEEL CO., NET DOLLAR

SALES, 337

--IN JONES & LAUGHLIN STEEL

CORP., TOTAL DOLLAR SALES,

337, 344, 345

--IN MONSANTO CHEMICAL CO.,

DOLLAR SALES, 337

--IN MONTGOMERY WARD & CO.,

NET DOLLAR SALES, 283,

337, 338, 348-9

--IN NATIONAL LEAD CO., NET

SALES, 337

--IN NATURAL PHENOMENA, 341

--IN ADVERTISING EFFECTIVENESS

OF THE PINKHAM MEDICINE Co

28

--IN PITTSBURGH PLATE GLASS Co

NET DOLLAR SALES, 283

337-8, 348-9

--IN PROCTOR & GAMBLE CO.,

GROSS DOLLAR SALES, 337

--IN RAILROAD STOCK PRICES,

129

--IN RAYON PRODUCTION, 337

--IN REPUBLIC STEEL CORP.,

INGOT PRODUCTION, NET TONS,

337

--IN SEABOARD AIR LINE, GROSS

OPERATING REVENUE, 337

--IN SEARS, ROEBUCK & COMPANY,

NET SALES, 337, 346, 347

--IN STANDARD OIL OF CALIFORNIA,

GROSS OPERATING INCOME, 337

--IN STOCK PRICES, 129, 239

--IN SUNSPOTS WITH ALTERNATE

CYCLES REVERSED, 337

--IN SWIFT & COMPANY, DOLLAR

SALES, 337, 354, 355

--IN TREE RINGS AT FAIRLEE,

VERMONT, 337

--IN U.S. RUBBER COMPANY, NET

DOLLAR SALES, 220, 337

--IN WILSON & COMPANY, DOLLAR

SALES, 337

--IN YOUNGSTOWN SHEET AND TUBE

COMPANY, GROSS DOLLAR

SALES, 337, 350, 351

6.07-YEAR CYCLE

--IN STOCK PRICES, 239

6.1-YEAR CYCLE

--IN INDUSTRIAL COMMON STOCK

PRICES, 170, 171, 178

--IN PIG IRON PRICES, 207-9

--IN RAILROAD STOCK PRICES,

126-9, 178

--IN STOCK PRICES, 129

6.120-YEAR CYCLE

--THEORETICAL, 239

6.2-YEAR CYCLE

--IN RAILROAD STOCK PRICES,

126-9

6.3-YEAR CYCLE)

6.4-YEAR CYCLE)

--IN PIG IRON PRICES, 207-9

6.5-YEAR)

6.6-YEAR) CYCLE

--IN PIG IRON PRICES, 207-9

--IN RAILROAD STOCK PRICES,
 126-9, 178

6.610-YEAR CYCLE

--THEORETICAL, 239

6.8-YEAR CYCLE

--IN PIG IRON PRICES 207-9

6.86-YEAR CYCLE

--IN STOCK PRICES, 239

6.9-YEAR) CYCLE

7.2-YEAR)

--IN PIG IRON PRICES, 207-9

--IN RAILROAD STOCK PRICES,
 126-9, 178

--IN STOCK PRICES, 129

7-YEAR CYCLE

--IN INDUSTRIAL COMMON STOCK
 PRICES, 166, 167, 178

--IN RAILROAD STOCK PRICES,
 126-9, 178

7.22-YEAR CYCLE

--IN STOCK PRICES, 239

7.370-YEAR CYCLE

--THEORETICAL, 239

7.4-YEAR CYCLE

--IN PIG IRON PRICES, 207-9

7.550-YEAR CYCLE

--THEORETICAL, 239

7.6-YEAR CYCLE

--IN PIG IRON PRICES, 207-9

7.7-YEAR CYCLE

--IN STOCK PRICES, 5, 8,
 129, 239

7.8-YEAR CYCLE

--IN HARMONIC ANALYSIS OF
 COTTON PRICES, 5

--IN RAILROAD STOCK PRICES,
 126-9, 178

7.9-YEAR CYCLE

--IN INDUSTRIAL COMMON STOCK
 PRICES, 166-9, 178

--IN PIG IRON PRICES, 207-9

--IN RAILROAD STOCK PRICES,
 126-9, 178

8-YEAR CYCLE

--IN CIGARETTE PRODUCTION, 330

--IN INDUSTRIAL COMMON STOCK
 PRICES, 5, 8

8.17-YEAR CYCLE

--IN INDUSTRIAL COMMON STOCK
 PRICES, 5, 8

--IN STOCK PRICES, 239

--THEORETICAL, 239

8.2-YEAR CYCLE

--IN INDUSTRIAL COMMON STOCK

PRICES, 170, 171, 178

--IN STOCK PRICES, 129

8.3-YEAR CYCLE

--IN RAILROAD STOCK PRICES,
 126-9, 178

8.320-YEAR CYCLE

--THEORETICAL, 239

8.5-YEAR CYCLE

--IN COTTON PRICES, 5

--IN INDUSTRIAL COMMON STOCK
 PRICES, 168-9, 172, 173,
 178

--IN STOCK PRICES, 5, 8, 129,
 239

9-YEAR CYCLE

--HYPOTHETICAL, 280

--IN NEW MEMBERS IN THE
 PRESBYTERIAN CHURCH IN
 U.S.A., 244

--IN PIG IRON PRICES, 122

--IN RAILROAD STOCK PRICES, 124

--IN SOCIAL DISEASE, 17

- IN STOCK PRICES, 23, 45, 46
- THEORETICAL, 239
- 9.1-YEAR CYCLE
 - IN PIG IRON PRICES, 207-9
- 9.2-YEAR CYCLE
 - IN COMMON STOCK PRICES, 23, 42, 44, 45, 56, 49, 110-20, 149, 239
 - IN PIG IRON PRICES, 122, 207
 - IN RAILROAD STOCK PRICES, 128, 178
- 9.3-YEAR CYCLE
 - IN INDUSTRIAL COMMON STOCK PRICES, 166, 167, 178
 - IN PIG IRON PRICES, 122
- 9.6-YEAR CYCLE
 - IN ACREAGE OF WHEAT, 327
 - IN ARIZONA TREE RINGS WIDTH, 300
 - IN GAME ABUNDANCE IN WESTERN CANADA, 180
 - IN INDUSTRIAL COMMON STOCK PRICES, 8
 - IN LYNX ABUNDANCE 8, 284, 285
- 9.881-YEAR CYCLE
 - THEORETICAL, 239
- 10-YEAR CYCLE
 - IN STOCK PRICES, 129, 239
- 10.17-YEAR CYCLE
 - IN THE ADVERTISING EFFECTIVENESS OF PINKHAM MEDICINE COMPANY, 30, 32
- 10.2-YEAR) CYCLE
- 10.3-YEAR) CYCLE
 - IN RAILROAD STOCK PRICES, 126-9, 178
- 10.4-YEAR CYCLE
 - IN PIG IRON PRICES, 207-9
- 10.65-YEAR CYCLE
 - IN STOCK PRICES, 239
- 10.7-YEAR CYCLE
 - IN INDUSTRIAL COMMON STOCK PRICES, 172, 173, 178
 - IN RAILROAD STOCK PRICES, 126-9
 - IN STOCK PRICES, 129
- 10.790-YEAR CYCLE
 - THEORETICAL, 239
- 10.8-YEAR CYCLE
 - IN INDUSTRIAL COMMON STOCK PRICES, 166, 167, 178
- 10.860-YEAR CYCLE
 - THEORETICAL, 239
- 10.9 TO 11.4-YEAR CYCLES
 - IN RAILROAD STOCK PRICES 126-9
- 11-YEAR CYCLE
 - IN INTERNATIONAL WAR, 201
 - IN STOCK PRICES, 129
- 11.07-YEAR) CYCLE
- 11.1 -YEAR) CYCLE
 - IN PIG IRON PRICES, 207-9
 - IN STOCK PRICES, 239
- 11.2-YEAR CYCLE
 - IN INDUSTRIAL COMMON STOCK PRICES, 178
 - IN INTERNATIONAL WAR, 135, 136, 140, 204
- 11.3-YEAR CYCLE
 - IN INDUSTRIAL COMMON STOCK PRICES, 166, 167, 178
- 11.75-YEAR CYCLE
 - THEORETICAL, 239
- 12-YEAR CYCLE
 - IN STOCK PRICES, 129
- 12.1-MONTH CYCLE
 - IN INDUSTRIAL COMMON STOCK PRICES, 170, 171, 178
- 12.2-YEAR CYCLE
 - IN PIG IRON PRICES, 207-9
- 12.5-YEAR CYCLE
 - IN STOCK PRICES, 239
- 12.7-YEAR CYCLE
- IN INDUSTRIAL COMMON STOCK PRICES, 168, 169, 178
- 12.75-YEAR CYCLE
 - THEORETICAL, 239
- 12.8-YEAR TO 13.3-YEAR CYCLES
 - IN RAILROAD STOCK PRICES, 126-9
- 13-YEAR CYCLE
 - IN AUTOMOBILE SALES, 271, 275, 276
- 13.1-YEAR CYCLE
 - IN INDUSTRIAL COMMON STOCK PRICES, 166, 167, 178
- 13.5-YEAR) CYCLE
- 13.6-YEAR) CYCLE
 - IN INDUSTRIAL COMMON STOCK PRICES, 129, 166, 167, 178
 - IN STOCK PRICES, 239
- 13.78-YEAR CYCLE
 - THEORETICAL, 239
- 13.8-YEAR CYCLE
 - IN PIG IRON PRICES, 207-9
- 14.45-YEAR CYCLE
 - IN RAILROAD STOCK PRICES 197-9
- 14.5-YEAR CYCLE
 - IN STOCK PRICES, 129, 239
- 14.88-YEAR CYCLE
 - THEORETICAL, 239
- 15.2-YEAR CYCLE
 - IN PIG IRON PRICES, 207-9
- 15.6-YEAR CYCLE
 - IN RAILROAD STOCK PRICES 126-9, 178
- 16-YEAR CYCLE
 - IN STOCK PRICES, 129, 239
 - IN THEORETICAL, 239
- 16.4-YEAR CYCLE
 - IN RAILROAD STOCK PRICES, 126-9
- 17.3-YEAR CYCLE
 - IN STOCK PRICES, 205-6
- 17.75-YEAR) CYCLE
- 17.8 -YEAR) CYCLE
 - IN ARIZONA TREE RINGS WIDTH, 164
 - IN INDUSTRIAL COMMON STOCK PRICES, 166-7, 178
 - IN MANY PHENOMENA, 121
 - IN PIG IRON PRICES, 162, 207-9
- 18.17-YEAR CYCLE
 - STOCK PRICES, 239
- 18.33-YEAR CYCLE
 - IN REAL ESTATE CONSTRUCTION, 122
 - IN STOCK PRICES, 129
- 18.38-YEAR CYCLE
 - THEORETICAL, 239
- 19.0-YEAR) CYCLE
- 19.1-YEAR) CYCLE
 - IN ADVERTISING EFFECTIVENESS OF PINKHAM MEDICINE Co., 30, 32
 - IN INDUSTRIAL COMMON STOCK PRICES, 166-7, 178
 - IN RAILROAD STOCK PRICES, 126-9
- 19.4-YEAR)
- 19.45-YEAR) CYCLE
- 19.5-YEAR)
 - IN INDUSTRIAL COMMON STOCK PRICES, 124
 - IN RAILROAD STOCK PRICES, 23, 44, 121
 - IN STOCK PRICES, 42, 44, 129 239
- 19.6-YEAR CYCLE
 - THEORETICAL, 239
- 20-YEAR CYCLE
 - IN RAILROAD STOCK PRICES, 126-9, 178
- IN STOCK PRICES, 198-9
- 20. 9-YEAR CYCLE
 - THEORETICAL, 239
- 21-YEAR CYCLE
 - IN STOCK PRICES, 129, 239
- 22.14-YEAR) CYCLE
- 22.20-YEAR) CYCLE
 - IN INTERNATIONAL WAR, 135-6, 138, 204
- 22.15-YEAR CYCLE
 - STOCK PRICES, 239
- 22.24-YEAR CYCLE
 - THEORETICAL, 239
- 22.5-YEAR (270-MONTH) CYCLE
 - IN ADVERTISING EFFECTIVENESS OF PINKHAM MEDICINE Co., 30, 32
- 23.13-YEAR CYCLE
 - STOCK PRICES, 239
- 23.3-YEAR CYCLE
 - IN STOCK PRICES, 129
- 23.60-YEAR CYCLE
 - THEORETICAL, 239
- 23.2-YEAR CYCLE
 - IN INDUSTRIAL COMMON STOCK PRICES, 166-7, 170-3, 178
- 25.8-YEAR CYCLE
 - IN INDUSTRIAL COMMON STOCK PRICES, 166-7, 178
- 26.1-YEAR CYCLE
 - IN RAILROAD STOCK PRICES, 126-9, 178
- 27.8-YEAR CYCLE
 - IN PIG IRON PRICES, 207-9
- 29.46-YEAR CYCLE
 - THEORETICAL, 239
- 30-YEAR CYCLE
 - IN STOCK PRICES, 129, 239
- 32.4-YEAR CYCLE
 - IN RAILROAD STOCK PRICES, 126-9, 178
- 35.2-YEAR CYCLE
 - IN CHINESE EARTHQUAKES, 14, 15, 219
- 35.9-YEAR CYCLE
 - IN FREQUENCY OF THE AURORA 14, 15
- 37.0-YEAR) CYCLE
- 37.4-YEAR) CYCLE
 - IN CHINESE EARTHQUAKES, 14, 15, 212, 215-16
- 37.25-YEAR CYCLE
 - IN STOCK PRICES, 239
- 37.5-YEAR CYCLE
 - IN STOCK PRICES, 129
- 37.75-YEAR CYCLE
 - THEORETICAL, 239
- 40-YEAR TO 48-YEAR CYCLE
 - IN RAILROAD STOCK PRICES, 126-9
- 40.9-YEAR CYCLE
 - IN STOCK PRICES, 297
- 51-YEAR CYCLE
 - THEORETICAL, 239
- 51.5-YEAR CYCLE
 - IN STOCK PRICES, 129, 239
- 52.2-YEAR CYCLE
 - IN PIG IRON PRICES, 207-9
- 54-YEAR CYCLE
 - IN COAL CONSUMPTION, FRANCE, 84
 - IN COAL PRODUCTION, ENGLAND, 84
 - IN INDUSTRIAL COMMON STOCKS NOT YET FOUND, 84
 - IN LEAD PRODUCTION, ENGLAND, 84
 - IN THE NUMBER OF TEXTILE WORKERS, IN ENGLAND, 84
 - IN PIG IRON PRODUCTION, ENGLAND 84
 - IN U. S. A. PRODUCTION, 85-6
 - IN U. S. A. IRON AND STEEL

PRODUCTION, 86
 --IN VALUE OF FRENCH RENTE
 AND ENGLISH CONSOLS, 84
 --IN WAGES OF AGRICULTURE
 WORKERS, ENGLAND, 84
 --IN WHEAT PRICES, ENGLAND,
 84
 --IN WHOLESALE PRICES,
 GERMANY, 84
 --IN WHOLESALE PRICES,
 GREAT BRITAIN, 84
 --IN WHOLESALE PRICES,
 U. S. A. 84-5

54-5-YEAR CYCLE
 --IN RAILROAD STOCK PRICES
 126-9, 178
 57-YEAR CYCLE
 --IN INTERNATIONAL WAR,
 135, 201, 210
 60-YEAR TO 9 2-YEAR CYCLE
 --IN RAILROAD STOCK PRICES,
 126-9, 178
 100-YEAR CYCLE
 --IN RAILROAD STOCK PRICES,
 126-9, 178
 --IN MUSIC, 154

105-YEAR CYCLE
 --IN WOMEN'S DRESS FASHIONS,
 131-34
 142-YEAR CYCLE
 --IN INTERNATIONAL WAR, 201, 4
 151.8-YEAR CYCLE
 --IN PIG IRON PRICES, 207-9
 500-YEAR CYCLE
 --IN MUSIC, 154
 700-YEAR CYCLE
 --IN CLIMATE AND IN THE AURORA
 BOREALIS, 13

GENERAL INDEX

ACCIDENT PREVENTION, NEGLECTED
 ASPECTS OF, 16
 ADDITIONS TO THE LIBRARY, 24,
 58, 115, 191, 226, 251, 252,
 290, 291, 331
 ADVERTISING EFFECTIVENESS OF
 THE PINKHAM MEDICINE
 COMPANY
 --19-MONTH CYCLE IN)
 --4.08-YEAR (49-MONTH)
 CYCLE IN)
 --4.42-YEAR (53-MONTH)
 CYCLE IN)
 --4.92-YEAR (59-MONTH)
 CYCLE IN)
 --5.6-YEAR (67-MONTH)) 25-34.
 CYCLE IN) 356
 --6.0-YEAR (72-MONTH))
 CYCLE IN)
 --10.17-YEAR CYCLE IN)
 --19.0-YEAR CYCLE IN)
 --22 1/6-YEAR CYCLE IN)
 --22.5-YEAR CYCLE IN)
 AGRICULTURE WORKERS, 54-YEAR
 CYCLE IN WAGES OF, IN
 ENGLAND, 84
 ALLIS-CHALMERS MANUFACTURING
 COMPANY, 6-YEAR CYCLE IN
 SALES, 342, 343
 AMERICAN VISCOSSE CORPORATION,
 6-YEAR CYCLE IN SHIPMENTS,
 337
 AMOROUSNESS OF WOMEN, 14-DAY
 CYCLE IN, 181
 ARIZONA
 --6.06-YEAR CYCLE IN TREE
 RINGS AT, 341
 --9.6-YEAR CYCLE IN TREE
 RINGS AT, 300
 --17.75-YEAR CYCLE IN TREE
 RINGS AT, 164
 ARMCO STEEL CORPORATION,
 6-YEAR CYCLE IN SALES, 337
 ARMOUR AND COMPANY, 6-YEAR
 CYCLE IN SALES OF, 282,
 337-8
 ATMOSPHERIC ELECTRICITY
 --EFFECT UPON BUSINESS,
 130
 --3.42-YEAR (41-MONTH)
 CYCLE IN, 130
 AURORA BOREALIS
 --35.9-YEAR CYCLE IN THE
 FREQUENCY OF, 14, 15
 --700-YEAR CYCLE IN, 13
 --CHINA, 53
 --KOREA, 53
 --JAPAN, 53
 AUTOMOBILE SALES
 --6-YEAR CYCLE IN, 271,
 275, 276
 --13-YEAR CYCLE IN, 271
 275, 276
 AVERAGE WHOLESALE PRICES, 57

BAROMETRIC PRESSURE, 6-YEAR
 CYCLE IN, 337
 BETHLEHEM STEEL COMPANY, 6-YEAR
 CYCLE IN PRODUCTION, 337
 BUILDING CONSTRUCTION, SEE
 CONSTRUCTION
 BUSINESS
 --HYPOTHETICAL, 9-YEAR CYCLE
 IN, 280
 CHAOS, ORDER OUT OF, 236-9,
 ALSO SEE ERRATA, 363
 CHINA, FREQUENCY OF EARTHQUAKES
 IN,
 --11-MONTH CYCLE IN) 14, 15,
 --35.2-YEAR CYCLE IN) 212,
 --37-YEAR CYCLE IN) 215-6,
 --37.4-YEAR CYCLE IN) 219
 CIGARETTE PRODUCTION 8-YEAR
 CYCLE IN, 330
 CIVIL CONFLICT, BATTLE INDEX, 57
 CLIMATE, 1ST TO 19TH CENTURY,
 --CALIFORNIA, 53
 --WESTERN ASIA, 53
 CLIMATE, 700-YEAR CYCLE IN, 13
 COAL CONSUMPTION, 54-YEAR CYCLE
 IN, IN FRANCE, 84
 COAL PRODUCTION, 54-YEAR CYCLE
 IN, IN ENGLAND, 84
 COMBINING CYCLES, 48, 49, 186,
 187, 220, 221, 224, 225
 COMPANY G
 --12.6-MONTH CYCLE IN THE
 SALES OF, 94-96, 99-109
 --32.85-MONTH (2.74-YEAR)
 CYCLE IN) 242-3
 --33-MONTH (2.75-YEAR))
 CYCLE IN)
 COMPOUND CYCLES, 48-49
 CONSTRUCTION, RESIDENTIAL BUILDING
 --33-MONTH CYCLE IN, 211, 356.
 CONTINENTAL OIL COMPANY, 6-YEAR
 CYCLE IN GROSS OPERATING
 INCOME OF, 337
 COTTON PRICES
 --6-YEAR CYCLE IN, 337
 --7.8-YEAR CYCLE IN, 5
 --8.5-YEAR CYCLE IN, 5
 COTTON PRODUCTION 6-YEAR CYCLE
 IN, 337
 CYCLE ANALYSIS FOR BEGINNER, 97
 DATA, 141
 DISEASE, 9-YEAR CYCLE IN, 17
 DUNBAR'S CYCLE, STABILITY OF, 267
 E. I. DU PONT DE NEMOURS AND
 COMPANY, 6-YEAR CYCLE IN SALES
 OF, 337
 EARTH, IN CONNECTION WITH SHORT-
 WAVE RADIO DISTURBANCES, 88
 ELECTRIC BRAINS, 188
 EMOTION, 35-DAY CYCLE IN, IN
 MALE WORKERS, 16
 ENGLISH CONSOLS, 54-YEAR CYCLE IN
 VALUE OF, 84
 FAIRLEE, VERMONT, 6-YEAR CYCLE IN
 TREE RINGS AT, 337

FAR EAST, CYCLES IN, 53
 FELLOWSHIP AWARDED, 318
 FINANCIAL, 96
 FORECAST OF STOCK MARKET MADE IN
 1912, 197-200
 FOUNDATION AFFAIRS, 54, 185, 286,
 325
 FOUNDATION FOR THE STUDY OF
 CYCLES, MEMBERSHIP GROWTH OF,
 JUNE 1951-JULY 1952, 325
 FRENCH RENTE, 54-YEAR CYCLE IN
 VALUE OF, 84
 FUTURES, CYCLES IN, 56
 GAME ABUNDANCE, 9.6-YEAR CYCLE IN,
 180
 GAMES, CYCLES IN, 223
 GENERAL ELECTRIC COMPANY 6-YEAR
 CYCLE IN ORDERS RECEIVED, 123,
 337, 340
 B. F. GOODRICH COMPANY, 6-YEAR
 CYCLE IN SALES OF, 337
 GOODYEAR TIRE AND RUBBER COMPANY,
 6-YEAR CYCLE IN SALES OF, 337
 HARMONIC ANALYSIS, MULTIPLE
 --IN INDUSTRIAL STOCK PRICES
 1871-1950, 166-79
 --IN PIG IRON PRICES, 1784-
 1951, 207-9
 --IN RAILROAD STOCK PRICES,
 1831-1950, 123-9
 HARMONIC ANALYZER, PICTURE OF, 179
 179
 HARMONICS, DEFINITION OF, 93
 HOSKINS TIME CHART, 224
 HOW HAS IT WORKED OUT? 242, 282,
 327, 330, 364
 INLAND STEEL COMPANY, 6-YEAR CYCLE
 IN SALES OF, 337
 INDEX OF RAILROAD STOCK PRICES,
 1831-1951, 143
 INDIAN RAINFALL, 9.6-YEAR CYCLE
 IN, 306
 INSTITUTE FOR 1952, 35
 INTERNATIONAL CONFLICT
 --BATTLE INDEX OF, 57
 --11.2-YEAR CYCLE IN, 135-6,
 140-1, 201, 204
 --22.14-YEAR) CYCLE IN, 135-6,
 --22.20-YEAR) 138, 204
 --56-YEAR CYCLE IN, 135, 201,
 210
 --142-YEAR CYCLE IN, 201
 IRON PRICES, SEE PIG IRON PRICES
 IRON AND STEEL PRODUCTION, 54-
 YEAR CYCLE IN, IN U.S.A., 86
 JAPAN, 700-YEAR CYCLE IN TREE RINGS,
 13
 JONES AND LAUGHLIN STEEL CORPORATION,
 6-YEAR CYCLE IN SALES OF, 337,
 344-5
 JOURNAL OF CYCLE RESEARCH, 110, 184,
 301-24
 JUPITER,
 --PICTURE OF, 88
 --IN CONNECTION WITH SHORTWAVE

CYCLES — Report for December 1952

- RADIO DISTURBANCES, 88-9
 LEAD PRODUCTION, 54-YEAR CYCLE IN, IN ENGLAND, 84
 LETTERS, 20, 55, 111, 186, 220, 245, 287, 356
 LOGARITHMIC SCALES EXPLAINED, 278-81
 LOGARITHMS EXPLAINED, 245
 LYNX
 --9.6-YEAR CYCLE IN ABUNDANCE OF, 8, 284-5
 MARKET, BULL, 265
 MARS,
 --PICTURE OF, 88
 --IN CONNECTION WITH SHORTWAVE RADIO DISTURBANCES, 88
 MERCURY, IN CONNECTION WITH SHORTWAVE RADIO DISTURBANCES, 88
 MICO INSTRUMENT, 60, 123, 166, 178, 207
 MONSANTO CHEMICAL COMPANY, 6-YEAR CYCLE IN SALES OF, 337
 MONTGOMERY WARD AND COMPANY, 6-YEAR CYCLE IN SALES OF, 283, 337-8, 348-9
 MONTH NUMBERS, STANDARD, 319
 MOVING AVERAGE, USE OF IN CYCLE ANALYSIS, 18, 224, 25, 248
 MOVING DIFFERENCE, DEFINITION OF, 249-50
 MOVING PERCENTAGE AND MOVING RATIO, IMPORTANCE IN CYCLE ANALYSIS, 249
 MULTIPLE HARMONIC ANALYSIS,
 --IN INDUSTRIAL STOCK PRICES, 1871-1950, 166-79
 --IN PIG IRON PRICES, 1784-1951, 207-9
 --IN RAILROAD STOCK PRICES, 1831-1950, 123-9
 MUSIC
 100-YEAR CYCLE IN, 154
 500-YEAR CYCLE IN, 154
 NATIONAL LEAD COMPANY, 6-YEAR CYCLE IN SALES OF, 337
 PERIODOGRAM
 --OF INDUSTRIAL COMMON STOCK PRICES, 166-79
 --OF RAILROAD STOCK PRICES,
 --OF PIG IRON PRICES, 207-9
 PERIODIC TABLE, EXPLANATION OF, 100-9, 215
 PERIODOGRAM, DEFINITION OF, 169,
 --OF INDUSTRIAL COMMON STOCK PRICES, 1871-1950, 166-178
 PIG IRON PRICES
 --40-MONTH CYCLE IN, 277
 --9-YEAR CYCLE IN REVERSE PHASE, 122
 --17 3/4-YEAR CYCLE IN, 162-5
 --BENNER'S FORECAST OF, 50-2
 --MULTIPLE HARMONIC ANALYSIS OF, 207-9
 --POSSIBLE CYCLES IN, 1784-1951
 PIG IRON PRODUCTION, 54-YEAR CYCLE IN, IN ENGLAND, 84
 PINKHAM MEDICINE COMPANY, CYCLES IN SALES AND ADVERTISING OF, 25
 PITTSBURGH PLATE GLASS COMPANY, 6-YEAR CYCLE IN SALES OF, 283, 337-8, 348-9
 PLANETARY EFFECTS ON SHORTWAVE RADIO, 87-93
 POETRY, PERIODIC INSPIRATION IN, 254
 PREDIX CHARTS, 55, 80, 119, 148-50, 227, 246, 260
 PRESBYTERIAN CHURCH IN THE U.S.A. NORTHERN, NEW MEMBERS OF, 9-YEAR CYCLE IN, 244
 PRICES, BENNER'S PROPHECIES OF UPS AND AND DOWNS IN, 60
 PROCTOR AND GAMBLE COMPANY, 6-YEAR CYCLE IN SALES OF, 337
 PRODUCTION, 54-YEAR CYCLE IN, IN U.S.A. 85-6
 PROMOTION ACTIVITIES, REPORT ON, 325-6
 QUESTIONNAIRE, RESULTS OF, 146-7
 QUESTIONS AND ANSWERS, 189, 224, 249
 RANDOM NUMBERS, CYCLES IN, 9-12, 47
 RATIO SCALES EXPLAINED, 278-81
 RATIO OR SEMI-LOGARITHMIC SCALE, 278
 RAYON PRODUCTION, 6-YEAR CYCLE IN, 337
 RAYON PRODUCTION, 6-YEAR CYCLE IN, 337
 READERS' REACTIONS, 146, 147
 REAL ESTATE ACTIVITY, 18.33-YEAR CYCLE IN, 122
 REPUBLIC STEEL CORPORATION, 6-YEAR CYCLE IN PRODUCTION, 337
 RESEARCH, 5, 42, 87, 162, 197, 233, 265, 297
 RESIDENTIAL BUILDING CONSTRUCTION, SEE CONSTRUCTION
 REVERSING CYCLES, 48, 49
 RUNNING AVERAGE, DEFINITION OF, 224
 RHYTHMIC CYCLE, DEFINITION OF, 224
 SATURN
 --PICTURE OF, 88
 --IN CONNECTION WITH SHORTWAVE DISTURBANCES, 88, 89
 SEABOARD AIR LINE, 6-YEAR CYCLE IN REVENUE OF, 337
 SEARS, ROEBUCK AND COMPANY, 6-YEAR CYCLE IN SALES OF, 337
 SEASONAL CYCLE, RELATIONSHIP TO HUMAN CHARACTERISTICS AND ABILITIES, 240
 SECTION MOVING AVERAGE, USE OF, 18, 19
 SHORTWAVE RADIO, PLANETARY EFFECTS ON, 87
 SILK ROAD, SILIA, 53
 SINE CURVE, DEFINITION OF, 189
 SOCIAL DISEASE, 9-YEAR CYCLE IN, 17
 SOLAR ACTIVITY, 53
 STANDARD MONTH NUMBERS, 319
 STANDARD OIL OF CALIFORNIA, 6-YEAR CYCLE IN INCOME OF, 337
 STEEL PRODUCTION, SEE IRON AND STEEL PRODUCTION
 STOCKHAM VALVES AND FITTINGS, INC., 123, 166, 207
 STRIKES, 14 2/3-YEAR CYCLE IN NUMBER OF, IN U.S., 316
 SUNSPOT NUMBERS WITH ALTERNATE CYCLES REVERSED, 6-YEAR CYCLE IN, 337
 SUNSPOTS, ASIA, CHINA, 53
 SUPPLEMENTS, 25, 59, 253, 301, 335
 SWIFT AND COMPANY, 6-YEAR CYCLE IN SALES OF, 337, 354, 353
 TECHNICAL, 18, 53, 97, 212, 278
 THEORETICAL CYCLE LENGTHS, BY W. N. DREW, 236-9 SEE ALSO ERRATA, 363
 TEXTILE WORKERS, 54-YEAR CYCLE IN NUMBER OF, IN ENGLAND, 84
 THEORY OF CYCLES, 40, 335
 TREE RINGS
 --6-YEAR CYCLE IN, AT FAIRLEE, VERMONT, 337
 --6.06-YEAR CYCLE IN, IN ARIZONA, 341
 --9.6-YEAR CYCLE IN, IN ARIZONA, 300
 --17.75-YEAR CYCLE IN, IN ARIZONA, 164
 --700-YEAR CYCLE IN, IN JAPAN, 13
 --EFFECT OF FROST ON, 24
 U.S. WHOLESALE COMMODITY PRICE INDEX, MAJOR WAR PERIODS, CHART OF, 144
 UNITED STATES
 --3.42-YEAR (41-MONTH) CYCLE IN ECONOMIC PHENOMENA, DISCOVERY OF, 152
 U.S. RUBBER COMPANY, 6-YEAR CYCLE IN SALES OF, 220, 337
 VENUS, IN CONNECTION WITH SHORTWAVE RADIO DISTURBANCES, 88
 VERMONT, FAIRLEE, 6-YEAR CYCLE IN TREE RINGS AT, 337
 WAR, SEE INTERNATIONAL CONFLICT, CIVIL CONFLICT
 WEIGHTED MOVING AVERAGE, USE OF, 18, 19, 99-109
 WESTERN CANADA, 9.6-YEAR CYCLE IN ABUNDANCE OF GAME IN, 180
 WHEAT ACREAGE, 9.6-YEAR CYCLE IN 327 --CHART OF, 327-9
 WHEAT PRICES, 54-YEAR CYCLE IN ENGLAND, 84
 WHOLESALE PRICES, 54-YEAR CYCLE IN, --IN GERMANY, 84
 --IN GREAT BRITAIN, 84
 --IN U.S.A., 84, 85
 WOMEN'S AMOROUSNESS, 14-DAY CYCLE IN, 181
 WOMEN'S DRESS FASHIONS, 105-YEAR CYCLE IN, 131-134
 WOMEN'S TEMPERATURE, 28-DAY CYCLE IN, 24
 YOUNGSTOWN SHEET AND TUBE COMPANY, 6-YEAR CYCLE IN SALES OF, 337, 350, 351

ERRATA 1952

PAGE NUMBER	
7	THE FORMULA USED TO DERIVE FIG. 1 DIFFERS SLIGHTLY FROM THE FORMULA GIVEN BELOW IT.
178	RAILROAD STOCK PRICE CYCLES SHOULD READ 15.6 INSTEAD OF 15.8, 20.0 INSTEAD OF 24.0, 32.4 INSTEAD OF 31.6, AND 54.5 INSTEAD OF 54.6.
226	"FLIAS" SHOULD READ "ELIAS."
237-9	"LENGTH IN MONTHS" SHOULD READ "LENGTH IN YEARS."

IN ADDITION, ERRORS OF SPELLING OR TYPOGRAPHY OCCUR ON PAGES 4, 17, 21, 36, 43, 87, 90, 111, 112, 115, 123, 139, 152, 153, 189, BUT AS NO CHANGES OF MEANING ARE INVOLVED IT DOES NOT SEEM WORTH WHILE TO ENUMERATE THEM HERE.

How it Came Out

The 33-Month Cycle in Residential Building Construction

Way back in 1939 three Cornell University Professors discovered a 33-month cycle in residential building construction.

In my report for April 1951, I brought their figures up to date as shown by the zig-zag and the thin solid line in the chart below.

The solid line in the chart below shows the percentage comparison between each month and the corresponding month a year ago, smoothed by a three-month moving average.

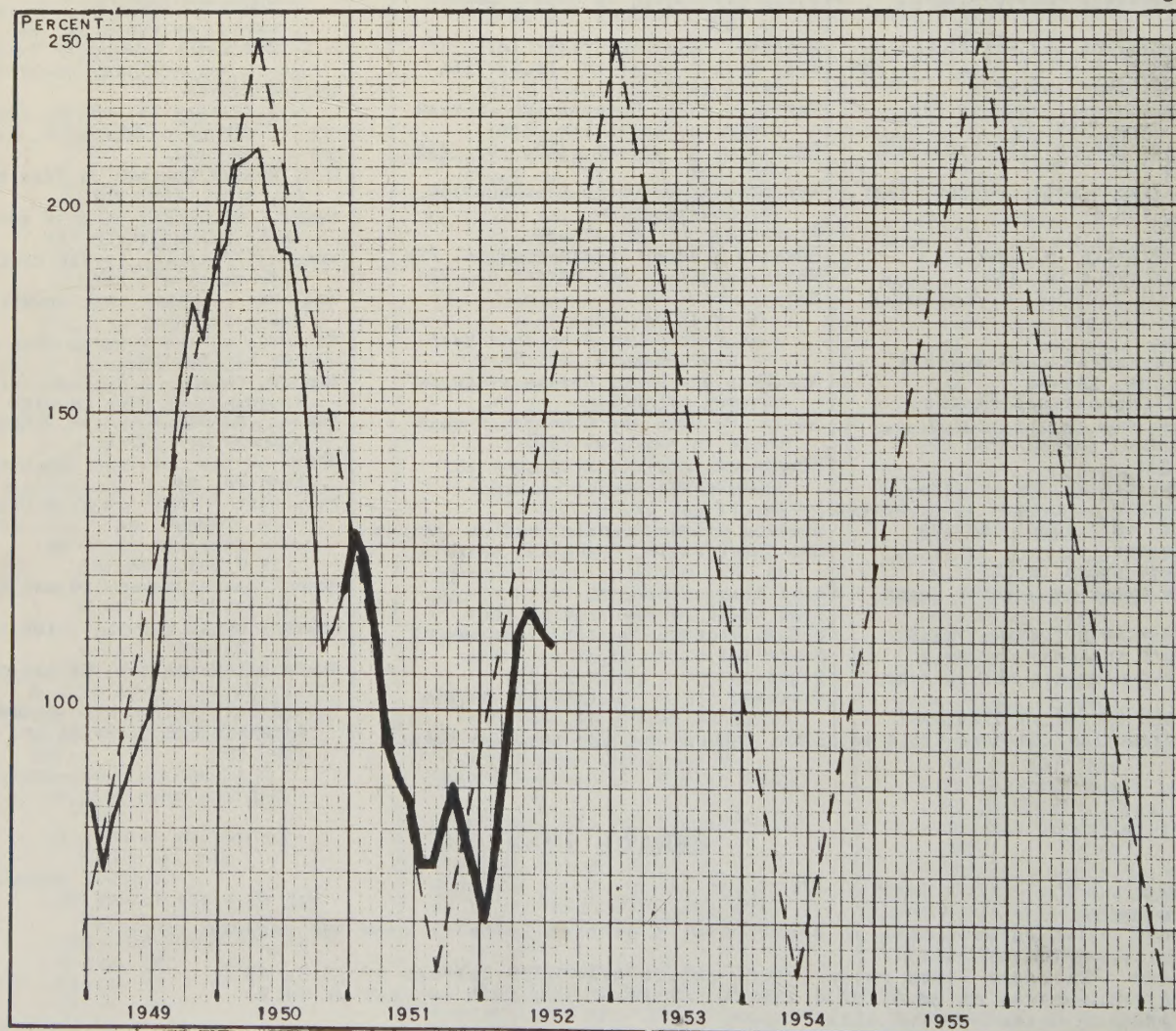
The new figures which have become available since my report for April 1951 have been

plotted by means of a bold line.

In my April 1951 report I said, with the necessary qualifications, "we can expect the **relative** dollar value of residential contracts awarded to decline until the latter part of 1951, after which, relatively compared with twelve months previous, contracts awarded should increase again until January 1953."

For a full discussion, refer to my April 1951 report. But, in a nutshell, as you can see from the chart, residential contract awards are now due to decline until about the middle of 1954, if this cycle continues.

e r d



The curve represents a three-month moving average of the 12-month moving percentage of the F. W. Dodge Corporation's valuation of residential building construction contracts awarded in 37 states. The new figures which have become available since the report for April 1951 have been plotted by means of a bold line.